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Protracted Negotiations in Argentina

AFTER having spent two months in the Argentine, it seems to be very doubtful whether the British Mission has achieved any progress at all, and so far as the problem of the British-owned railways is concerned, the indications are that the matter has not yet been the subject of any serious discussion. Presumably, some preparation was made between the Governments concerned for these talks before the despatch of the mission, but so far it is very difficult to see what useful purpose has been served. According to reports from Buenos Aires, major difficulties have arisen from the fact that although the British Mission made an offer on meat a month ago, it has received no answer or any discussion on it, and secondly, although it had been agreed that the problem of the railways should be discussed, there has been no discussion on the subject. The Argentine Foreign Minister is reported as having said that the differences between the two sides has arisen from British insistence on dealing preferentially with meat and railway problems, and leaving until later those connected with Argentine sterling funds blocked in Great Britain. The impression cannot be escaped that more careful preparation might have resulted in a clearer agenda for the talks, and that in addition the discussions must have been marked by a lack of accommodation which augurs ill for a successful outcome. Already the meat contract has been allowed to lapse, and at the present rate of progress the same fate may well overtake the concessions of the railway companies at the end of the year. The latest news available at the time of going to press indicated that Sir Reginald Leeper, the British Ambassador, had had talks with the Argentine President and Foreign Minister, and it had been agreed that the British Mission should resume discussions with the Government. Meantime the Mission is visiting Uruguay.

* * * *

Effects of Nationalisation of Coal, Iron, and Steel

Some of the more serious effects of the Government's policy of nationalising the coal and iron and steel industries are dealt with by Mr. E. H. Lever in his statement as Chairman of Richard Thomas & Baldwins Limited, circulated with the annual accounts. The company will shortly lose its colliery undertakings and it will be faced immediately with the difficulty of obtaining sufficient coal of proper quality at a reasonable price for its works. Mr. Lever is under no delusion as to the effect of nationalisation on costs. He points out that although he would like to believe that nationalisation eventually will bring down the price of coal and coal products, the reverse is likely to be the case. Of the nationalisation of iron and steel, the directors believe that at any time it would be against the true interests of the community, since it must lead to a decrease in efficiency and an increase in costs, but that to press forward a scheme of nationalisation at present, when the industry's plans for development are advanced, and their speedy execution essential, is likely to strike a serious blow at the country's economic recovery. Some indication of the hold-up which the Government's plans are occasioning is given in that part of his address in which Mr. Lever deals with the plans for the erection of new strip mills in Wales. He points out that delay in proceeding with the physical work is inevitable, and has already taken place, and the whole plan will have to be re-considered.

* * * *

Mr. Duncan Bailey on Wagon Production

Mr. Duncan Bailey, Chairman & Managing Director of Charles Roberts & Co. Ltd., makes some pertinent remarks in his address to stockholders circulated with the accounts for the year to March 31 last. Modern 16-ton all-steel mineral wagons have been adopted by the railways, and the Ministry of Transport has ordered large numbers to be constructed both in private shops and in three of the Royal Ordnance Factories; the Ministry has brought out further designs, one of which is more expensive to build than the wagons already in traffic. Mr. Bailey points out that no concern, however efficient, can give maximum production if the works programme is changed frequently by the introduction of new designs. He also crosses swords with the Chancellor of the Exchequer on dividend limitation. Mr.

Bailey says he fails to see on what grounds objection is taken to payment of large dividends, bearing in mind the present purchasing power of the £, very heavy taxation, and that the Labour partner in industry has received great increases in wages. He submits that the other partner—Capital—in industry is entitled to equal consideration, and if there is to be that square deal which Government spokesmen claim to be desirous of giving, it can be brought about only by distributing as fairly as possible the results of enterprise. The results achieved by the company have been made possible only by continued endeavour and the constant exercise of initiative, not only through the war, but through many earlier years.

* * * *

Coach Building Dispute at Swindon

The dispute between members of the National Union of Vehicle Builders and the National Union of Railwaymen as to which men should perform the work of riveting steel roofs to steel cant rails, which has caused the complete cessation of new coach construction at Swindon since January last, was referred to the Trades Union Congress Disputes Committee for settlement. We understand that this Committee has now decided that the work should be carried out by members of the N.U.V.B. It is to be hoped that this will mean an immediate recommencement of work on the new coaches, as the dispute has already prevented something like 150 to 160 coaches being turned out, although from the first the Great Western Railway has maintained the position that it was immaterial to it by whom the work was performed.

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L.N.E.R. Clerical Staff Training Centre

Lessons to be learnt from improvisation were stressed by Sir Ronald W. Matthews when he opened the L.N.E.R. clerical staff training centre at Hadley Wood recently. During the war, temporary centres were set up for the intensive training of staff taking the place of men and women called to the forces, and during this emergency the importance of practical training made itself apparent. In other pages of this issue we give a description of the Hadley Wood school, together with illustrations, from which it will be seen that students at St. Ronans will find a great deal of emphasis laid on practical instruction. In the courses in station practice, each of which lasts two weeks, theoretical work is reduced to a minimum, and practical work is done on actual railway forms, leading in logical order from the initial stages to the striking of a station balance sheet. Other practical work is carried out in an annexe to the main building. Here there are two full-size booking and parcel offices, representing the modern and the traditional, and also the most up-to-date telecommunication school in the country, covering every phase of railway telephone, telegraph, and teleprinter operation, and consisting of two fully-equipped stations. It is gratifying to learn that a unit has been incorporated for training blind operators. St. Ronans is a residential school and every effort has been made by the company to provide congenial surroundings for the students in their leisure hours.

* * * *

Notable Railway Bridge Converted for Highway

Red Rock Bridge, which until a year ago carried the Santa Fe Railroad over the Colorado River at Topock, was completed in 1890. It was a single-line structure having a 990-ft. through main truss—including a 330-ft. suspended span—the largest of its kind in the U.S.A. at that time; there was also a 120-ft. deck approach span. To meet increasing train loads, this bridge had to be strengthened from time to time, and in 1910 an additional concrete pier had to be built under the centre of the suspended span and the trusses suitably modified. Recently, however, the railway decided to replace it with a new bridge, opened for traffic last year. This enabled the administration to hand over the old bridge to the highway authorities of Arizona and California, which States it connects. Their corresponding road bridge was fit only for light traffic, and its width was only 17 ft. By replacing the railway decking of Red Rock Bridge with a concrete slab, a roadway 20 ft. 5 in. wide between handrails and capable of carrying loads up to 15-ton lorries with 12-ton trailers, has been secured. The slab has a minimum thickness of 7 in. and is supported by new I-beam stringers resting on the original cross-girders. A shorter roadway alignment, with easier approach gradients, has also been made possible by converting the railway approaches for highway use.

* * * *

Road Hauliers' Conditions of Carriage

In the memorandum submitted to the Minister of Transport in July by the main-line railways and the Road Haulage Association on the co-ordination of road and rail freight transport facilities, it was mentioned that certain measures designed to promote further co-ordination were contemplated. One of these was that the observance of rates and conditions of carriage should be made statutory, with adequate statutory protection for users. The first step has been taken by the issue by the Road Haulage Association of standard terms and conditions of carriage which it recommends should be put into operation for an interim period. In a very useful explanatory foreword the liabilities of private and common carriers are clearly set out and the importance emphasised of hauliers obtaining written conditions of carriage signed by the consignor of the goods, having regard to the difficulty of proving a verbal contract covering such matters. It is obviously also desirable that conditions of carriage should be standardised throughout the road haulage industry, and road hauliers are urged to adopt these conditions as an interim measure pending the introduction of statutory conditions. The conditions are similar to the railway conditions of carriage in many respects, but they are not identical.

* * * *

An Early American Work on Accidents

We have read recently an interesting work entitled "Notes on Railroad Accidents," published at New York in 1879. Its author was Charles F. Adams, Jnr., son of the American Minister of that name who represented the United States in this country during the Civil War and for some years a Railroad Commissioner for Massachusetts. The copy lent to us had the added interest of once having belonged to William Stroudley. The book exhibits a wide acquaintance with the details of railway working in several countries and considerable capacity for grasping the essential principles involved, tempered by a sound sense of proportion. Its author's judgments were invariably well-considered and based on a careful weighing of all facts of a case. His appreciation of what had been accomplished in this country in signalling, interlocking, and block working was generous. If he found our "conservatism" at times tiresome, he was as much annoyed by American "obstinacy." For our well-known Inspecting Officer, Sir H. W. Tyler, and our safety legislation, he had a very high respect, and he saw correctly that, whereas the block telegraph would spread in Great Britain, it was the "automatic electric block system"—then some nine years old in New England—to which the American lines from force of circumstances, would turn increasingly. It seems that in 1879 the worst terror of American accidents was fire, caused by the use of open stoves in the cars, and telescoping was also very bad. Adams was a warm advocate of the Miller car-platform and coupling, as a safeguard against that.

* * * *

Tensile Tests on Rail Steel

Insistence on tensile tests as part of the basis of acceptance of rail steel is now rather more rare than was once the case. The test still figures in the British Standard rail specifications, though the indefensible maximum limit of breaking strength, which in earlier years was fixed as 48 tons per sq. in., and was an obstacle to any improvement in the wearing capacity of rail steel, fortunately disappeared in the 1935 revision of the specification. Tensile tests, however, can be influenced so strongly by factors outside the quality of the steel itself, that it is a moot point whether this test, valuably informative though it is if reasonably conducted, should be binding in relation to acceptance or rejection of rails. Of these factors the two of the most importance are the finished surface of the test piece,

and the time that is allowed to elapse between preparation and the actual pulling. If a test piece on steel of this quality is pulled too soon after it has been turned, the steel is in an unduly disturbed condition, and it may be difficult to obtain the specified minimum elongation of 10 per cent. At a certain steelworks recently, a series of rail testpieces was taken directly off the lathe for testing, and showed an average breaking strength of 53.8 tons per sq. in., with no more than 12.4 per cent. elongation (some tests being near the lower elongation limit) and 16.3 per cent. reduction of area. The same week at this works, another series of tests on rails of almost precisely the same composition, which had been left roughly a fortnight between preparation and pulling, gave an average of 53.5 tons per sq. in. average breaking strength, with 18.9 per cent. elongation and 32.4 per cent. reduction of area. There is no doubt that the latter figures more accurately than the former represent the true physical properties of the steel.

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Locomotive Building in Argentina

In recent years there have been various claims of locomotives having been constructed entirely in Argentina, and with a view to ascertaining just what has occurred in this direction, the author of the railway engineering notes in *The Review of the River Plate*, which is published in Buenos Aires, has made an analysis of the subject. In his report he states that a detailed study shows that, although many engines have been "reconstructed" and "fabricated," the number of those built from the beginning comes down to one, and even in that case it is probable that certain imported parts were incorporated. This engine was built about 1883, when the old Western Railway, then a Provincial Government line, was in a precarious position as to locomotive stock. An engine built in 1865 by Sharpe, Stewart & Company, was dismantled at Tolosa Works, and detailed drawings were made, from which the new engine was built. It was known as No. 48, *Primera Argentina*. Many locomotives have been reconstructed in Argentina, but all these included a proportion of parts either imported for the work or remaining from the original design. Machines for frame-planning and frame drilling have not yet been imported or manufactured in Argentina. Steel foundries have not so far attempted the casting of wheel centres, nor has tyre or axle manufacture been undertaken. The relative absence of heavy industries makes it unlikely that locomotive building will be practised in Argentina for some time to come, but local engineers and mechanics have shown a high degree of resourcefulness and ingenuity in reconstruction.

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Oil Burning Locomotives—Back to 1920

The decision of the railways, at the request of the Minister of Transport, to arrange for the conversion from coal to oil burning of 1,217 locomotives, recorded in our last week's issue, recalls the experiments which were made in 1920 by the London & North Western Railway. An illustrated description of the fitting of the L.N.W.R. 4-4-0 type express passenger locomotive No. 2585, *Watt*, of the "Precursor" class, with the Scarab oil-burning apparatus, was given in our September 10, 1920, issue, and at the same time we reproduced a gradient profile of the route between Euston and Birmingham taken on a demonstration run, with steam pressure and oil consumption curves. Then, as now, the supply of coal for locomotive burning was causing anxiety, and labour problems in the mining industry gave rise to concern. Moreover, at that time it was believed that economy could be achieved in the use of oil as against coal fuel, especially as it was thought probable that the price of the former might decline, while that of the latter almost certainly would rise. The point arises as to whether, if oil fuel is to be used at all, it would not be better to use diesel traction in place of the less efficient steam locomotive. Diesel fuel is more expensive than the ordinary furnace oil which can be used for firing a steam locomotive. However, the overall thermal efficiency of a diesel locomotive is of the order of 30 per cent., compared with about 8 to 10 per cent. for a reciprocating steam engine. At the present time, the necessity to save coal at all costs, and the impossibility of securing delivery within reasonable time of other forms of engine, has dictated the decision to convert steam locomotives.

The British Railway Officer in India

AT the beginning of the second world war the Government of India recruited in England several young men to serve as officers on Indian State Railways. These will probably prove the last of the distinguished line of men who have embarked on a lifetime's career in the service of Indian railways.

Indianisation of railway services has proceeded at a rapid rate since direct recruitment of Indians to the superior services was started about thirty-five years ago. By 1934, 38.84 per cent. of gazetted railway officers were Indian. In 1944 the percentage had risen to 64.61, and during the next year it increased to 67.15. Thus, whilst in 1934 two-thirds of Indian State Railway officers were British, ten years later the position was reversed and two-thirds of the officers were Indian.

These statistics, however, do not give a true picture of the present state of affairs unless it is realised that a large majority of the remaining British officers, because of their length of service, are in the senior administrative ranks, the executive ranks being almost completely Indianised. In spite of its logical explanation, the administrative control of Indian railways by British officers has been the subject of much questioning and criticism during Legislative Assembly debates in recent years.

This display of impatience for the complete Indianisation of railway services is readily understandable. The railways themselves belong to India, and Indians will soon be governing their own country, but, after the well-established merit-cum-seniority procedure for promotion, it would take five years or more for the senior administrative ranks to become predominantly Indianised.

All State railway officers, both British and Indian, now serving in India who were directly recruited to the superior services were appointed either by the Secretary of State or by the Governor General in Council. Formerly, both British and Indian officers were appointed by the Secretary of State. Later, appointment of Indian officers was undertaken by the Governor General, whilst British officers continued to be appointed by the Secretary of State, and in the middle thirties the responsibility for recruitment of all officers was undertaken by the Governor General. Thus, with the winding up of the office of Secretary of State, which will presumably be one of the early steps in the impending transfer of power, the majority of British officers, with or without compensation, will lose the careers on which they have embarked under contract with the Secretary of State, and will have to face the alternative of seeking to continue their present employment under the new Government or looking for jobs elsewhere.

The re-employment of British railway officers by the new Indian Government may cause some difficulty, because the British officer on the present terms of service is entitled to certain privileges and additional pay to which his Indian colleague has no claim. In addition to the basic pay of a post, which is the same for both British and Indian officers of the same seniority, the British officer receives "overseas" pay, which increases from £135 to £360 p.a. with length of service, but diminishes again with increase of basic pay beyond a certain limit.

Thus, a British District Officer with about eight years' service will receive £975 a year, whilst his Indian colleague of the same seniority and performing similar duties will receive only £675. At the upper end of the scale the General Manager of a Class I railway will receive £3,150 a year, whether he be British or Indian, no "overseas" pay being allowable at such a high rate of basic pay. The British officer is also entitled to more generous leave, and a passage fund which for a married officer with two children would amount to a cash payment of about £1,600 during twenty years' service.

It is not to be expected that a British officer will readily sacrifice these privileges for service under the new Government, nor is it likely that the new Government will be willing to continue to award these privileges. With regard to pay it would appear practicable to raise the present basic scales of pay to the general level of the effective pay drawn by the British officers.

The inadequacy of the present rates of basic pay has been

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represented to the authorities by junior Indian officers, and the change of Government might offer a suitable opportunity to meet the representations of the Indian officers whilst providing an incentive for British officers to continue in service. The same argument might be applied to leave concessions, though not to passage concessions. Cessation of passage fund payments necessarily, in the case of all but the most senior officers, would be a severe deterrent to those British officers who were seeking employment with the new Government.

Today, India has a system of State railways which in most respects can bear comparison with any in the world, and the efficient way in which this system functions is in itself indicative of the excellent personal relationships which exist between British and Indian officers. It is this spirit of co-operation in service of the community which, multiplied throughout the activities of the sub-continent, will be of inestimable value in the final and, possibly, finest phase of British influence in India.

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L.P.T.B. and Trade Union Membership

OPINIONS may differ widely as to whether membership of a trade union should be compulsory, but there can be no question that insistence on the membership of a particular trade union as a condition of employment may raise very serious issues. The recent agreement between the London Passenger Transport Board and the Transport & General Workers' Union has been variously reported in the press, and it is necessary, therefore, to bear in mind that the Board's official statement refers only to certain grades of employees (who are not specified) engaged in operating and maintenance work connected with the Board's road transport services. To enable the Board to rely on the observance of collective agreements and full co-operation of the staff, it has decided not to continue in its service any employee in the road transport grades concerned who is unwilling to join the Transport & General Workers' Union, and those employees who are at present members of the National Passenger Workers' Union, formed in 1938, are to be given an opportunity to join the Transport & General Workers' Union.

Although no reference is made to the point in the Board's statement, it would seem to follow that if any employee in the grades concerned is subsequently expelled from the Transport & General Workers' Union from any cause, the Board will be obliged to dismiss him. No indication is given as to whether a similar agreement will be negotiated with the trade unions representing the railway or workshop staff of the Board's undertakings, but it will presumably be only a matter of time before the question is raised by those concerned, and it may also have considerably wider repercussions.

There can be little doubt that it is advantageous for employers to be able to negotiate agreements concerning wages and conditions of service with responsible bodies or associations representing employees, and during the last twenty or thirty years considerable progress has been made with trade unions in the establishment and use of agreed machinery for the joint discussion of such problems which has proved of benefit.

The question of compulsory membership of a trade union has been raised by the railway trade unions from time to time, but it has been the practice of the railway companies never to interfere with the freedom of their employees to join or refrain from joining a trade union. One objection which we see to the decision that employees must be a member of a particular trade union is that if a workman comes into conflict with his trade union over a matter which in no way concerns his employer, he may be expelled fron the union and the employer would have no alternative but to dismiss him.

In these circumstances, the remark of Mr. Ness Edwards, Parliamentary Secretary to the Minister of Labour, in the House of Commons on July 30 that "it is an inalienable right on the part of the workers in industry to decide with whom they will work" appears to have very definite limitations. Further, we recall that in the debate on the Bill to repeal the Trades Disputes Act in April last, the Minister of Labour, Mr. Isaacs, expressed confidence that "the fears of victimisation, intimidation, and prevention of the operation of conscience will not be realised as a result of any action by the trades unions."

Despite this assurance, as the recent repeal of the Trades Disputes Act of 1927 now necessitates members of trade unions "contracting out" of paying the political levy, it is not outside the bounds of possibility that in the future refusal to "contract in" might well become at least a partial ground for the expulsion of men from trade unions and involve their dismissal.

It is a fair assumption that even if the Minister of Labour did not sanction this action of the Board, he had prior knowledge of the proposed action, because the Board, like the main-line railways, is under the control of the Minister of Transport.

It is reported that at a joint meeting of London Transport workers held at Peckham on August 28 an organiser of the National Passenger Workers' Union made the point that the bigger union wanted a closed shop and was doing exactly what Hitler did when he came to power. In reply an official of the Transport & General Workers' Union said that if anyone understood the function of trade unionism it must be obvious that there was not room for two unions. We do not know how the three large railway trade unions view this remark, seeing that they each have negotiating machinery with the railway companies and compete with each other for members from the same grades of staff. Moreover, there are something like 30 to 40 unions which cater for railway workshop staff. It seems clear that, in any event, the Board's action will have wide repercussions, the full extent of which cannot yet be foreseen.

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American Locomotive Practice

TO those who follow the trend of events as they affect the motive-power position on the railways of the United States, the present status of the steam locomotive is of particular interest. This is due, in the first place, to the development seen to be taking place in the increasing power capacity of modern engines of normal construction, and in the work now being done in connection with development of other types of steam power with turbine drive in one form or another, while at the same time the strides already made in the adaptation of diesel power to the needs of railway transport are of considerable significance.

So far as steam locomotives of conventional design are concerned, an article appearing elsewhere in this issue illustrates clearly modern trends in design and construction embracing locomotives of normal types for different classes of traffic, which are without question notable exampies of locomotive engineering in its most advanced form. So far as passenger service is concerned, it seems that modern conditions require the eight-coupled type with the 4-8-4 wheel arrangement. Moreover, to judge from the examples given, such engines appear to have reached something approaching standardisation so far as general design is concerned; in fact, even in details they seem to be much alike, as well as in potential power.

As an alternative to the two-cylinder 4-8-4, a four-cylinder design, as used by the Pennsylvania, would seem to offer the material advantage of dividing the power between four in place of two cylinders, resulting for a given power in lower piston thrusts and, in consequence, a reduction in the weight of the reciprocating masses to be balanced. From the standpoint of rail stresses, this is important, bearing in mind the very high individual axle loads necessary, even with eight coupled wheels, on account of the considerable tractive effort exerted by these large engines. A detail which attracts attention is the increasing use being made of roller bearings, in some instances for all axles, and often for the motion rods, for which, also, high class steels are generally used at least for high-speed locomotives.

The large tenders carrying 40 or more tons of coal and with high tank capacity attract attention as indicating a desire to increase the length of locomotive runs and so improve the mileage run per locomotive day. The many refinements seen in recent designs are no doubt costly; the desire, there-

fore, to increase availability and get more work from each engine is understandable. In addition, steam locomotives must now meet the competition offered by the diesel-electric type, which is making great headway in main-line working, very largely on account of its high availability. The extensive use now being made of diesel-electric power is well brought out by a reference to a return which we noticed in our American contemporary, the *Railway Age* of November 18, 1944, giving the distribution of passenger locomotive mileage for the period 1936-1944. From the particulars given, it is seen that, of the total passenger engine-miles run in 1936, 95.5 per cent. were worked by steam, 4.1 per cent. by electric, and 0.4 per cent. by diesel power. In 1944 similar figures for eight months were given as being 86.8, 5.4 and 7.8 per cent. In other words, the mileage worked by diesel traction increased from less than one per cent. to 7.8 per cent., practically all at the expense of steam, because electric traction remained almost stationary.

In the pages of our other American contemporary, the *Railway Mechanical Engineer* for June last, some rather significant points arrested our attention. They were (*a*) No orders or inquiries were reported for steam locomotives during May. All requirements called for diesel power; (*b*) an article entitled "Diesels to replace Electrics"; and (*c*) an editorial referring to the importance of an accurate knowledge of the cost of operating steam locomotives, which we found of particular interest. It was pointed out that as between steam and diesel, comparison should be made with modern steam locomotives as a basis. This is, of course, true; so also is the further statement made to the effect that one of the distinct advantages enjoyed by the steam locomotive has been its low cost, relatively to the diesel. If, on the other hand, the first cost of modern steam locomotives continues to rise, then the difference between steam and diesel will narrow. That is, of course, if the diesel type should fall in first cost with larger production. Much no doubt depends on the cost per horsepower of modern steam locomotives, and also on their availability. Compared with the diesel type, a high availability factor is admittedly an asset of value; in practice, however, its real value will depend upon the extent to which it can be utilised, which is quite another matter.

The amount of work a locomotive can do depends on service requirements, operating schedules, and other kindred matters quite apart from its mechanical perfections. Modern steam locomotives, if operated in conjunction with equally modern terminal facilities, can readily meet most railway requirements, but this fact should not be allowed to interfere with work having for its object its further development.

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Restoring the "British" Reichsbahn

GREAT strides have been made in restoring the aftermath of war on the German railway system in the British zone. Only in one aspect has the progress of rehabilitation not been as fast as is desirable, and that is in the repair of damaged locomotives and rolling stock: the total of available engines, carriages, and wagons is not a great deal higher now than it was eight months ago. This is due chiefly to the state of the workshops, practically all of which were more or less destroyed by bombing and battle. It has not been found possible to obtain the steel, timber, glass, and other material necessary for their repair to anything like the extent needed. Labour also has been in short supply, and output has been further reduced by the food cuts of recent months.

In all other respects, however, the progress of railway rehabilitation has been remarkable. In June, 1945, a month after the collapse of Germany, there were only 1,050 route km. (652 miles) of line in operation, while today there are nearly 12,000 route km. (7,450 miles) out of the 12,692 route km. (7,887 miles) which existed in the British zone before the war. In June, 1945, the average daily coal loadings were about 16,000 tons; today they are about 160,000 tons, and even 170,000 tons was touched in February of this year. The corresponding figures for freight traffic other than coal are equally striking. In June, 1945, some 23,000 tons were loaded, compared with 105,000 tons in June, 1946. In September, 1945, civilian passenger train km. amounted to 350,000 a week, whereas today they are 807,000. Civilian goods train km. a week were correspondingly 370,000 and 754,000.

Up to the end of February of this year, the Rhine, with its swiftly flowing waters, was crossed only by temporary wooden bridges. Being only of flimsy construction, these bridges were a source of anxiety, as they might be damaged or destroyed by barge traffic and pack ice in the winter months. Fortunately, they survived these perils, and also a very heavy flood early in February. Now the danger has been removed by the completion of a fine double-line permanent bridge at Duisburg-Baerl (opened on February 26), a single-line bridge at Cologne South which was opened early in May, and a third permanent bridge at Düsseldorf-Neuss which was opened officially by Mr. J. B. Hynd, the British Minister responsible for the British-occupation zone of Germany, on August 10. An article on Rhine railway bridges in the British zone was included in *The Railway Gazette* of April 26 last. The completion of these permanent bridges has greatly facilitated coal traffic from the Ruhr to France, Belgium, and Holland, and foodstuffs in the reverse direction, as well as passenger traffic, both military and civil, in both directions.

The fact that progress in repair of locomotives and rolling stock has not been as rapid as was hoped does not mean that traffic has increased only in like proportion. Better utilisation of locomotives, carriages, and wagons has permitted a very large expansion, as is indicated by the figures previously quoted. The supply of better quality coal and the fitting of brick arches to locomotives have improved coal consumption enormously. The restoration of yard facilities, telecommunications, and signalling have speeded up traffic to such an extent that the wagon turn-round has dropped from 9 or 10 days to 6.

Civil passenger traffic has increased out of all recognition in the past eight months, and it has been found possible to provide a service which now amounts to about half of what existed in 1932. Even so, all trains are greatly overcrowded and it is a common sight to see passenger trains with dozens of travellers riding on the footboards, on the buffers, and even on the roof. A recent 100 per cent. increase in fares above pre-war has done little to ease the congestion, so great is the urge to travel on the part of the German population. Regrettably, much of the travel is in pursuit of black market activities in food.

Quite a large number of long-distance passenger trains through the British zone, and to the other zones, is now provided, and the Nord Express was revived in May, running between Paris, Calais, Brussels, and the Scandinavian countries. In addition to these long-distance passenger trains, there is now considerable long-distance freight traffic from neighbouring countries, some of it passing right through the British zone, such as goods from Denmark, Norway, and Sweden to France and Switzerland, petrol from Hamburg to Czechoslovakia, and U.N.R.R.A. imports of foodstuffs to the countries of Central and Eastern Europe.

The General Management of the Reichsbahn set up at Bielefield in October last, is now firmly established, and the Germans are once again running their railways, always, of course, under close British supervision and control both at general headquarters and in the six divisions. The total staff of the Reichsbahn now numbers 249,188, which is considered to be on the high side, and steps are being taken to reduce it. At the moment, this reduction is slow, as the recent food ration cuts have necessitated the shortening of working hours in some categories.

Budgetary control of the Reichsbahn finances has been in operation since the beginning of this year. The German system of independent audit has been revived, and is used by the British staff to exercise financial supervision. The recent increase in passenger fares has resulted in a considerable excess of earnings over working expenses, and the railways can be said to be paying their way to this extent. However, in view of the enormous further sums that have yet to be spent in repairing war damage, the Reichsbahn cannot expect to be financially sound for years to come. Not a little of the success behind this recovery is due to the co-operation of the Germans themselves. Except for a few Nazis who have been, and are still being, eliminated, the average Reichsbahn employee is a railwayman first and a politician last. There is little doubt that recovery of the German railways will proceed steadily. The pace will depend largely on two factors, namely, food and coal. For most of the foregoing details we are indebted to the *British Zone Review*, the fortnightly journal of the activities of the Control Commission for Germany.

XUM

LETTERS TO THE EDITOR

(The Editor is not responsible for the opinions of correspondents)

Named Trains in the U.S.A.

88, Leadenhall Street,
London, E.C.3. August 26

TO THE EDITOR OF THE RAILWAY GAZETTE

SIR,—In a recent issue of your paper there was an editorial on named trains in which mention was made of the names of passenger and goods trains in this country and in the United States.

Perhaps your readers would be amused to hear that the generally believed first named train in the United States received its appellation in the '70s from a celebrated racehorse of the period. The train was the "Nancy Hanks" on the Atlanta-Savannah run of the Central of Georgia. This was also the name of President Abraham Lincoln's mother. However, it was the fame of the horse which caused the railway staff to make this choice in a naming contest. The carriages were embossed with likenesses of the favoured filly.

Very truly yours,
ASHTON C. BONNAFFON
General European Agent,
Pennsylvania Railroad

Carcroft Accident

Malayan Railway,
Kuala Lumpur. June 22

TO THE EDITOR OF THE RAILWAY GAZETTE

SIR,—I have read the account of the Ministry of War Transport accident report published in *The Railway Gazette* of April 26, 1946, with much interest.

It was indeed fortunate that there were no casualties in this instance, and I cannot help wondering if the findings of the Board of Inquiry would have been the same had a large number of persons been killed.

As an officer of some experience in the Running Department, it seems almost incredible to me that the driver, whose engine sustains such damage as a left side connecting-rod broken loose and a front cylinder cover broken, resulting in pieces of his big-end spread around the countryside, could possibly be unaware of what was happening.

Might I be permitted to ask a few questions which do not appear to be dealt with in this report:—

(*a*) How many stops did the train make between Bradford and Carcroft?

(*b*) Did the drivers of the two engines examine their engines at any such stops?

(*c*) Did the driver of the leading engine examine the big-end in question at the last stop before the accident?

(*d*) How far from the scene of the accident was the last stop?

The answer to these questions would clearly indicate whether a proportion of the blame could rest on the driver concerned.

To state that: "This accident may fairly be regarded as mainly due to cumulative effects of the war" is hardly likely to create confidence in the travelling public, and will sound to the ears of the ordinary layman like a convenient phrase to cover up a multitude of sins.

Yours faithfully,
H. T. G. WRIGHT
Senior Locomotive Superintendent

Conjugated Valve Gear for 3-Cylinder Locomotives

116, Royston Road, Mountain Rise,
Pietermaritzburg, Natal, S.A. July 22

TO THE EDITOR OF THE RAILWAY GAZETTE

SIR,—Referring to recent correspondence in *The Railway Gazette*, as I understand it the geometry of this valve motion was originally presented in a paper read before the Institution of Locomotive Engineers, and that some years later the principle was developed into a practical valve gear by the L.N.E.R. As usually happens, a novelty introduced into locomotive design in Great Britain sooner or later appears on colonial railway engines.

When I went to the Nigerian Railway as General Manager, there were two classes of 4-8-2 locomotives fitted with three cylinders and the conjugated valve gear. One class had the motion behind the cylinders. It was virtually impossible to keep the central cylinder in phase, and its lame exhaust was painful to hear. Eventually, the C.M.E. wearied of continual adjustments, and locally designed, manufactured, and fitted a separate Walschaerts gear to the central cylinders of the class, when all was well. The other class had the motion ahead of the cylinders. These engines also gave trouble and were frequently out of service. We had to strengthen considerably the anchorage of the main pin supporting the oscillating cross-lever.

My own opinion (for what it may be worth) is that the heavy cross-lever—which has to be brought to rest and restarted twice per revolution—vibrates, adversely affecting maintenance. In any case, what is the object of fitting freak reciprocating valve gears? Practically the whole of the vast locomotive aggregate in North America is fitted with Walschaerts and Baker valve motions, well tried mechanisms requiring a minimum of maintenance. Why do in a more sensitive or complicated manner something which has already become standardised in simple robust form?

G. V. O. BULKELEY

The Alarm That Needs No Winding

9, West End Avenue, Pinner,
Middlesex. August 26

TO THE EDITOR OF THE RAILWAY GAZETTE

SIR,—Reference the "Alarm That Needs No Winding" on page 208 of your issue of August 23, I am surprised that this experience is considered worth a comment. Surely most people can find their way home subconsciously, without a thought as to which turns to take. Personally, I make my sub-conscious control carry me through as much of the routine of life as it can.

When I travelled a good deal by London's "Underground" I could decide on a route, say, from Victoria to Chancery Lane, and then think of other things, read, or even go to sleep. If someone asked me for a direction while I was changing trains at, perhaps, Tottenham Court Road, I should have to pause to observe where I was before I could reply.

I only once made a mistake by this practice. I got into a wrong train late at night at St. James's Park station and settled down to read. When I looked up I was halfway round the Inner Circle, but approaching a station exactly the same number of stops from the start as the station to which I had intended to go on the Ealing line.

I suppose that this is somewhat similar to sleep-walking, but I never do things sub-consciously unless I have willed them first.

Yours faithfully,
L. E. HAWKINS

Impressions of French Railways

Ightham Mote,
Sevenoaks. August 19

TO THE EDITOR OF THE RAILWAY GAZETTE

SIR,—These few impressions of French railways today, the first of a trip made in July, may perhaps interest some of your readers.

The "Golden Arrow" service was taken to Paris, the route subsequently being Rennes, Chateaubriant, Angers, Grenoble, Valence, Paris, and then back on the "Golden Arrow" again. One's chief feeling is of admiration for the way in which the French are restoring their railways after the ravages of the war. In this field, at least, they appear to be working to one purpose! The schedules are necessarily quite slow, because in so many places river bridges have been destroyed (*e.g.*, the several noble designs spanning the Loire), and in these cases a single line has usually been restored, which is traversed at walking pace. There are seven such slacks between Calais and Amiens alone, besides a diversion for about 4 km. immediately south of Etaples.

The engines one sees on the expresses seem on the whole to be in better condition than those in England—perhaps they were not being made so much use of after 1940?—and the sidings, besides being full of bombed and burnt-out wagons still on wheels, contain more antique types of locomotives than ever (the joy and wonder of so many observers from this country), as it is all part of the characteristic French parsimony not to scrap but rather to rebuild, or at least to retain as if for rebuilding.

Admittedly, far fewer express services are running than in Great Britain, but one's impression was that relatively more restaurant-car services have been restored, nor has their glory departed so greatly—again very typical of the French! Fish rather than meat was always my experience, and bread tickets were carefully collected. The track is certainly good enough for present speeds.

As to the running experienced, the "Golden Arrow" from Victoria was formed (on a Monday) of nine Pullmans, two ordinary corridor vehicles, and two vans, which one of the smaller Bulleid Pacifics ran to Dover in 103 min. 55 sec. against the booking of 100 min., net time being about 99. The queue at Dover to get one's passport stamped was rather tedious

and irksome, but doubtless there is some objection to getting this done on the train. The not absolutely spick and span exterior of *Canterbury* served to remind one that the war has not been over so very long.

The train on the French side consisted of five corridor vehicles, three Pullmans, a restaurant car, and two vans, the engine being 231 No. E46, a Chapelon Pacific. With the aforesaid bridge slacks, the schedule to Paris has to be as much as 238 min., and the glory of this train, as regards speed, has departed. We took 235½ min. with slight signal delays in from St. Denis. Top speed was 31 sec. for a km. and some hard work was put in uphill.

Next morning I travelled to Rennes on the 9.45 from Montparnasse, a heavily loaded summer *rapide* providing a good service to St. Malo and Lannion. The train was made up to fifteen corridors, with restaurant-car service, and two vans, and was booked non-stop to Le Mans, 211 km., in 165 min., and then—after an 8-min. halt to change from electric to steam haulage—had 141 min. to run to Rennes, 163 km. We ran to time, including a major bridge slack (American bombing) approaching Chartres. The engine from Le Mans was an Etat 2-8-2, No. P65, coloured a distinct green.

One or two trips—some steam, some autorail—then were taken in the neighbourhood of Rennes, Chateaubriant, Segré, and Angers, all over single lines, poorly patronised, through agricultural country, and the writer was sorry to find that the little line between Segré and Angers St. Serge (a terminus some little way from the main St. Laud station and always productive of the antique) was closed, though in its stead a bus service was found to be almost as entertaining. The St. Laud station has been much damaged.

Thence to Grenoble, using from Angers to Lyons one of those remarkable cross-country services, which were always a feature of French timetables. This one was the 6.50 from Nantes, at present easily booked to Lyons, 644 km., in 11 hr. 25 min., with stops at Angers, Saumur, Tours, Vierzon, Bourges, Saincaize, Moulins, Paray, La Clayette, and Lozanne, and changes of engine at Tours, Vierzon, Moulins and Paray. The train loaded to seven corridors, including a *voiture-buffet*, and two vans, and did good business, particularly from Paray onwards, for there is only one "express" daily in each direction over this section. Scenically, it is a very fine route, and demanded much hard work from our engine, a P.L.M. 2-8-2.

Lyons to Grenoble, which before the war had some fast autorail services, now has virtually only stopping trains—five services each way, two steam, and three autorail. From Grenoble a trip was taken to beyond La Mure on the *ligne électrique*, which begins at St. Georges de Commiers, on the Grenoble-Veynes-Aix-Marseilles line, and pursues an extremely steep and winding course among the mountains through which the Drax has cut its course in deep gorges. It is difficult to believe that there can be more exciting *lignes pittoresques* than this.

These days in France there is no reduction on return fares, a measure introduced during the war years, presumably to discourage travel and keep receipts up as much as possible, so that it seemed worth while to catch at Valence the day *rapide*, leaving Marseilles at 7.55, for Paris, arriving at 21.55, travelling to Valence from Grenoble on the Isère valley line, of whose six services in each direction two are steam and four autorail. The day *rapide* from Marseilles was loaded to ten vehicles, including restaurant car, and two vans to Lyons, where two extras were attached, and from Lyons and Dijon the train was so full that passengers were standing in the corridors. On the P.L.M. main line, there were two points of particular interest. First, the sections between Laroche and Dijon, which had shortly before the war been trebled or quadrupled, have all been reduced again to double line, rails and sleepers presumably replacing shortages elsewhere. This applies also to certain sections on the Paris side of Laroche. Secondly, through engine-workings between Paris and Lyons have been suspended, and the old practice reverted to of changing engines at Laroche and Dijon. I would like to record also that I did not see a single P.L.M. 4-8-2. Is it only on the Riviera section that they now work?

The journey home from Paris on the "Golden Arrow" was punctual and called for no comment.

Yours faithfully,

J. H. COLYER-FERGUSSON

Italian High-Speed Electric Locomotive

Bolzano, Italy. August 24

To the Editor of The Railway Gazette

Sir,—In your issue of August 16, I have read a description of the new electric locomotive for the Lötschberg Railway. On page 171 it is reported that the power bogies have been regarded as unsuited to high-speed operation. It may interest you to know that the Italian State Railways have in operation from 1941 the Bo-Bo-Bo d.c. 3,000 volt 636 type locomotive—with a horsepower 1 hr. rating of 2,100 kW. and a maximum speed of 120 km.p.h. This type of locomotive is used for passenger and freight service on main lines.

A new type of Bo-Bo locomotive has now completed the tests and will be placed in service this year.

Yours faithfully,

S. BONAJUTO

Ispettorato Generale,
della Motorizzazione Civile,
Compartimento di Bolzano

[We remarked in our editorial comment on the Bo-Bo type locomotive for the Lötschberg Railway that, where high power output is required, power bogies have previously been regarded as unsuited to high-speed operation. In the past the rigid frame type of locomotive with individual axle drive has been the most popular design for high power output. It is interesting to note from Mr. Bonajuto's letter that the Italian State Railways have adopted the power bogie arrangement in recent years. In this country the electric locomotives for the Manchester-Sheffield line of the L.N.E.R., which were designed just before the war and one of which was actually completed, are to be of the power bogie type. However, the power rating of this locomotive is only 1,800 h.p., which is hardly comparable with the 4,000 h.p. of the Brown-Boveri Lötschberg locomotive, nor is it intended for high-speed operation.—Ed., *R.G.*]

Publications Received

Furness Railway: Its Rise and Development, 1846-1923. By W. McGowan Gradon. Manchester, 4: 333, Corn Exchange. 9¾ in. × 7½ in. 109 pp. Fully illustrated. Price 15s. 6d. net.—One of the larger of the secondary pre-grouping companies, the Furness rose from a small mineral line to a tourist and goods-carrying railway of considerable importance. Up to 1879 it was absorbing and combining with its neighbours. In the 'eighties, although severely hit by the depression in the iron and steel industry, it pushed ahead resolutely with the development of Barrow docks. Mr. Aslett, who became manager in 1895, inaugurated a progressive policy which involved the intensive cultivation of the Lakeland tourist traffic and the introduction of up-to-date coaching stock. Unfortunately the 1914-18 war interrupted this progress and the war traffic which the Furness had to bear severely taxed its resources. Until 1896 all the engines were from private makers, but thereafter, Mr. Pettigrew, as new locomotive superintendent, produced an efficient stud of standardised machines. The "Baltic" tanks, introduced by his successor just before the war, were the only inside-cylinder tanks of this wheel arrangement in the country.

Mr. McGowan Gradon has augmented his detailed and absorbing chronicle with maps of the Furness in its stages of evolution, gradient profiles and a good selection of locomotives and scenes, including the strange Lindal subsidence and the Levens Viaduct accident.

Titans of the Track: Southern Railway No. 2. London: Ian Allan Limited, 282, Vauxhall Bridge Road, S.W.1. 6 in. × 4 in. Illustrated. Paper covers. Price 1s. 6d.—The text of this attractively-produced booklet, the second in this series dealing with the Southern Railway, has been contributed by Mr. Cecil J. Allen. It covers mainly the locomotive and electric development of the company under two progressive C.M.Es., but also describes station and signalling practice, in which the Southern is well to the fore. Seven of the 24 fine illustrations are reproduced by courtesy of the Southern Railway; the remainder are the work of three well-known railway photographers, Messrs. H. C. Casserley, M. W. Earley, and O. J. Morris. Together they form a representative and impressive picture gallery of Southern motive power. It is a pity, however, that a photograph of one of the new CC1 electric locomotives has not been included.

Tyres and the War.—This booklet, which reviews the achievement of the British tyre industry from 1939 to 1945, has been issued by the Tyre Manufacturers' Conference, Trafalgar House, 9, Whitehall, London, S.W.1. Eighty million tyres were produced by the industry for the war, a remarkable output when the almost complete loss of the world's supply of natural rubber is considered. The initial difficulties of synthetic rubber production, however, were overcome steadily, with the result that, at the end of the war, 72·5 per cent. of all rubber for tyre making was synthetic.

The Scrap Heap

PROPAGANDA

The only true propaganda is service.

* * *

NAMED TRAINS IN THE U.S.A.—4

Passenger

Name	*Railway*	*Scheduled run*
Legislator	... Pennsylvania	... New York—Washington
Lone Star	... St. Louis—South Western	Memphis—Dallas
Mark Twain Zephyr	Chicago, Burlington & Quincy	St. Louis—Burlington
Mayflower	... New York, New Haven & Hartford	New York—Boston
Mercury	... New York Central	Cleveland—Chicago
Meteor ...	... St. Louis—San Francisco	St. Louis—Oklahoma City
Minute Man	... Boston & Maine : New York Central	Boston—Chicago
Mohawk ...	... New York Central	New York—Chicago

Goods

Name	*Railway*	*Scheduled run*
Guts ...	... Pennsylvania	... Buffalo—Harsimus Cove
Highball ...	... Great Northern	Seattle—Portland
Hot Shot	... Illinois Central	Council Bluffs—Chicago
Iron Master	... Seaboard	... Birmingham—Richmond
Lindy ...	... Central Railroad of New Jersey	Scranton—Allentown
Mae West	... Illinois Central	Waterloo—Hawthorne

* * *

AESTHETIC COMPENSATION

"The late Great Central Railway may never have paid any dividend on its ordinary shares, but those holding such shares who were railway-minded apart from a purely financial interest must have realised that they were getting a good return for their money with the fine engines designed by Mr. Robinson."—*From "The Robinson Locomotives of the Great Central Railway, 1900-23," by C. Langley Aldrich.*

MUSIC BY LONDON TRANSPORT

During the dark days of 1940, a young man climbed on to the stage in the canteen at the London Transport bus overhaul works, and gave an impromptu pianoforte recital. The next day he was joined by another lad with his piano-accordion, and subsequently several more volunteered to entertain. Thus was born the Chiswick Works "Spitfires" band of eight performers, which gave a broadcast on August 22, together with the male voice choir of the London Transport railway overhaul works at Acton. The choir has 30 singers, and was formed in 1942, primarily to provide lunchtime entertainment in the canteen. The "Spitfires" have broadcast several times, and have given numerous entertainments. By their efforts they have raised £1,000 for charity, including a large sum for the Sunshine Homes for Blind Babies. The Acton Male Voice Choir has given 80 performances to audiences of all sizes from 30 to 1,500 at hospitals, canteens, prisons, and elsewhere.

* * *

100 YEARS AGO

From THE RAILWAY TIMES, SEPT. 5, 1846

TO TUNNELLERS.—SCOTTISH CENTRAL RAILWAY PERTH TUNNEL.—To Let, the constructing of the Tunnel on this line of railway, in such lots as may be agreed upon. There are six shafts, all of which are sunk, and the headings of the Tunnel partly partly driven. The excavation is through Oldred sandstone and whinstone rock.

Tenders will be received up to Monday, the 7th day of September next, addressed to Messrs. John Stephenson and Co., Contractor's Office, Perth, and the work will on that day be let.

Parties tendering should be present on the day of letting.

There are no fool Questions!

Let's remember that on shipboard, in a motion picture studio, or in some other unfamiliar spot, we all might ask "foolish questions." No matter how silly a patron's question may seem, he's in earnest. Never be short, impatient or superior. Give a clear, careful answer in language the customer can understand. The more inexperienced he is, the more your consideration will earn his good will.

[From "Company Manners" issued by the New York Central System

NEXT WEEK'S RAILWAY CENTENARIES

Dalton Junction to Richmond (9¾ miles), York & Newcastle Railway, opened September 11, 1846.

* * *

NOT OUR CUP OF TEA

"Before the war a locomotive in first-class condition ran so smoothly that a cup of tea could be placed on the footplate without danger of a single drop overspilling."—*From "The Daily Mirror."*

THE FUTURE

A total of 135 engines are to be built, and ten of the famous "Royal Scot" locomotives and eight other express passenger engines are to be rebuilt and fitted with an improved type of boiler which will give them additional power. New third class passenger carriages to be built number 716, providing some 38,000 seats. The provision of these new carriages is in line with the short-term policy of adhering to the immediate pre-war design, so that clean and comfortable seats can be provided now.—*From "The L.M.S. Answers Your Questions."*

* * *

BY NUMBERS, BOARD

An acquaintance back from Vienna tells me his greatest joy is to listen to the simple shout, "Mind the doors, please," on the Underground, and the gramophone "Stand Clear of the Gates" at Euston.

In Vienna he counted 16 different directions on how to get on and off the trains. He gives the following syllable-for-syllable translation of one of these:

"After the signal '*Remain behind—the train is leaving,*' or the solitary signal, '*Remain behind,*' getting in or out of the train is dangerous to life, and therefore forbidden."

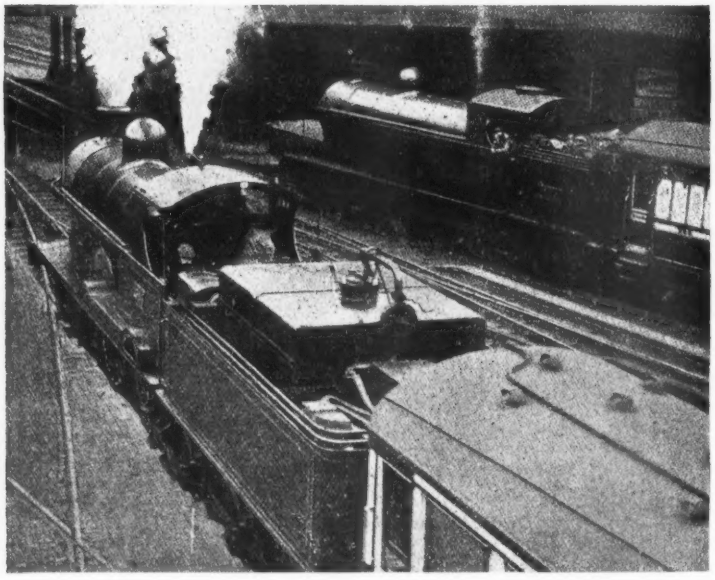
The careful addition of the words "to life" and the logical conclusiveness of the "therefore forbidden" are, it must be admitted, masterly.—*From the "Daily Graphic."*

* * *

SLEEPING IN TRAINS

That was a distressing story, told in *The Yorkshire Evening Post* recently, of the man who, when travelling from his home at Walmgate, York, to Selby, fell asleep in the train and woke up at Colchester. His indiscretion cost him £2 in a court at Ipswich, since he had not paid the fare. The soporific effect of railway travel has long presented a problem to those whose destination was not a terminus. The gently swaying motion of the train, the monotonous rhythm of the carriage wheels, and the endless, regular procession of telegraph poles, in itself as effective a sleep-producer as any number of imaginary sheep passing through a gate; all these things conspire to drive the traveller into the arms of Morpheus.—*From the "Yorkshire Post."*

Oil-Burning Locomotives—Back to 1920



L.N.W.R. locomotive, fitted with the "Scarab" oil-burning system, which was put into operation in 1920. *The illustration above is reproduced from our September* 10, 1920, *issue, which contained details of a test run and a description of the equipment* (see editorial note, page 259)

OVERSEAS RAILWAY AFFAIRS

(From our correspondents)

NEW ZEALAND

Wagons from Great Britain

The 3,000 "La" type wagons ordered from British firms [see *The Railway Gazette* of June 28.—ED., *R.G.*] are for shipment between January and August next year. The wagons will be shipped in parts, and assembled in railway workshops in New Zealand. Provided shipping is available, all 3,000 wagons should be in service in early 1948.

During the war, the New Zealand Government Railways building programme for rolling stock fell far behind. Hundreds of men from the railway workshops joined the forces, and all building materials available were needed for urgent war work. Had it not been for the war, 700 "La" wagons a year would have been built from 1942 to 1945 inclusive, and as soon as the war ended the Government set about making up leeway in building. The whole productive activity of United Kingdom wagon builders was then already allocated by the British Commonwealth Supply Council to orders of the highest priority, many of which had been on approved programmes for some time.

However, when the New Zealand position was represented to the Chairman of the Wagon Builders' Association, the association undertook to place New Zealand orders high on the list for 1947. In the past 16 months—which is roughly since the war with Germany finished—446 wagons of all types have been built in New Zealand, nearly half of them for livestock traffic.

WESTERN AUSTRALIA

Permanent Way Renewals

Apart from the construction of defence sidings, the only major civil engineering work undertaken during the war was the Swan View—Tunnel Junction deviation, which, in addition to overcoming difficulties in the working of up trains, through the tunnel, removed a serious bottleneck on the main Eastern line. The department now has been allotted £600,000 for the rehabilitation of the permanent way and other property under the 10-year programme, but it is intended, if possible, to spend this amount in five years at the rate of £120,000 a year.

There are 9,000,000 sleepers throughout the system, and, based on the average life of a sleeper being 22½ years, 400,000 normally are required annually for replacements. In the past four years, however, the department has been able to obtain an average of only 300,000 each year—in 1942 only 212,000 were used—so that it is 400,000 sleepers in arrears and supplies are still scarce. Not only is it short of sleepers, but departmental traffic has to give place to the haulage of wheat and superphosphate, so that difficulty is experienced in having sleepers transported throughout the 4,400 miles of system.

New Rails

During the war there was very little relaying of rails, because even if the men had been available, steel was acutely short. There are now 45 miles of rails on order, delivery of which is expected during the next 12 months, and it is intended to order an additional 100 miles for new works and other maintenance. These will probably take a further 12 months to arrive.

In one or two cases during the war, permanent way gangs were reduced to a strength of one man, and, as it was obviously impossible for him to move a rail by himself, the "gang" had to be amalgamated with another—also weak in numbers—and the combined force given a length of line to look after much in excess of peacetime practice. Because of difficulties such as this, the department had no option, in the interests of safety, but to reduce speeds over some sections, and some of these restrictions still apply.

CYPRUS

The Present Railway System

The Island of Cyprus has one public railway, which is owned by the Government, and two industrial railways which serve certain industries exclusively. The Cyprus Government Railway formerly extended from the port of Famagusta to Evrychou.

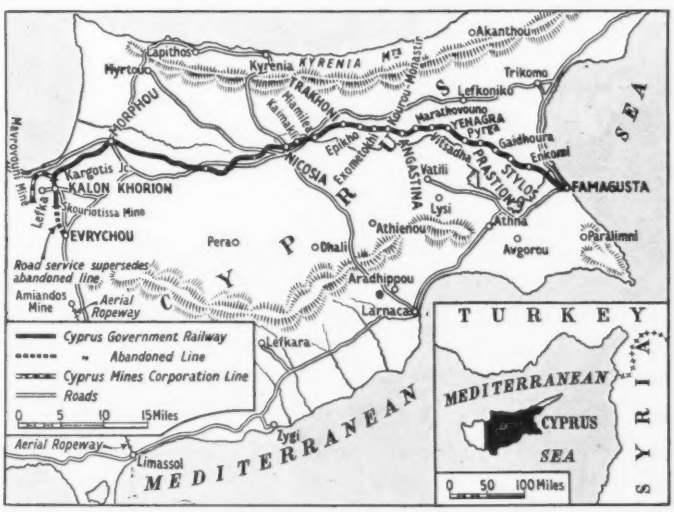
It was operated in two sections, from Famagusta to Morphou in October, 1905, and from Morphou to Evrychou in November, 1915. The section from Kalon Khorion was closed in June, 1932, and abandoned. A 5-mile road motor service between these points replaces the rail service.

On the same date (June, 1932) scheduled passenger services were discontinued on the portion between Nicosia, Morphou, and Kalon Khorion, but this portion remains open for goods traffic only. Both passenger and goods traffic is still maintained between Famagusta and Nicosia.

The Cyprus Government Railway at the present time has 71 miles of main-line track, on the 2 ft. 6 in. gauge. Its route is from Famagusta Harbour, through Famagusta Town, Nicosia, and Morphou, to Kalon Khorion. In 1944, 135,149 tons of goods were carried, compared with 141,140 tons in 1943. Passengers carried during 1944 numbered 301,319. The rolling stock comprises 12 locomotives, 17 carriages, 101 wagons, 8 petrol railcars, and 14 lorries.

The Cyprus Government Railway, Mines Branch, was constructed and paid for by the Cyprus Mines Corporation, but is the property of the Cyprus Government. The corporation has the right to use the railway for the life of its mining lease and any renewal thereof. It is used only for transport of ore and supplies of the corporation, and carries no passengers except employees of the corporation. Its length of line (single or first track) is 12·81 miles. At Kargotis Junction, which is one mile from Kalon Khorion, connection is made with the Government Railway.

The Limassol Amiandos Aerial Railway is an industrial railway serving exclusively the Tunnel Asbestos Cement Co. Ltd. It is a bi-cable ropeway, and has a length of single or first track totalling 18¼ miles. The ropeway was not in operation during the period January 1, 1941, to December 31, 1944.



Map showing the railways of Cyprus

UNITED STATES

American Locomotive Company

The American Locomotive Company reports that the net profit for the first six months of 1946 amounted to $3,950,016. This is equivalent, after preferred dividend requirements, to $1.83 per share on the shares of common stock outstanding at June 30, 1946. The semi-annual statement reflects costs and expenses incident to a strike which closed four of the company's plants for approximately two months early this year, the loss from which cannot reasonably be estimated. This was reduced, however, by a related credit to cost of goods sold of approximately $1,200,000, representing reductions in liabilities previously provided for, but found during the period to be in excess of requirements. During the year the company sold three-sevenths of the stock of the Montreal Locomotive Works Limited, previously a wholly-owned subsidiary.

Mr. Duncan W. Fraser, Chairman of the company, stated that the concern had $75,000,000 in unfilled orders on July 16, 1946, consisting principally of diesel-electric and steam locomotives and parts. Of this, $28,000,000 represented steam locomotives for export. In addition, Mr. Fraser stated, the Montreal Locomotive Works Limited, had $15,000,000 unfilled orders at that date, principally steam locomotives for export.

Modern American Locomotives

The comparison of powers and design features of a number of leading types

By E. C. Poultney, O.B.E., M.I.Loco.E.

AS an introduction to a note on modern steam locomotive practice in the United States, one cannot do better than quote from a speech* made by Dr. J. B. Innis, of the American Locomotive Company, who, remarking on advances achieved in the power developed, said: "Consider the progress made only in the last 40 years.

"At the St. Louis Exposition held in 1904, the Pennsylvania Railroad built a locomotive testing plant, the most modern of its kind at that time. Of all the freight locomotives tested, the most powerful produced 280 maximum i.h.p. per axle; today we have locomotives that produce 1,500 i.h.p. per axle, an increase of more than 400 per cent. The weight per driving axle of the best 1904 model was 43,000 lb. compared to 70,000 lb. for the 1,500 h.p. locomotive of today."

Referring to speeds attained at the present time, Dr. Innis stated that in 1942 there were 44 passenger schedules running between points from 50 to 202 miles apart, at speeds of 70 to 84 m.p.h. "Locomotives have reached or exceeded 120 m.p.h. There can be no question but that motive power units are available that can maintain any speeds that are considered safe from the standpoint of signals, roadbed, and curvature of track." It was further mentioned that speed means power, and power costs money, and that a 1,000-ton passenger train travelling on a fairly level track at 70 m.p.h., requires 1,850 h.p. at the drawbar. To maintain 80 m.p.h. with the same train would require an increase of 500 h.p., while at 90 m.p.h. a further addition of 550 h.p. would be necessary. At 100 m.p.h. the power required would be twice that necessary at 70 m.p.h.

Dr. Innis then took up the question of the type of locomotive that will pull these heavy trains in the future, a subject beyond the scope of the present article, which deals only with steam power.

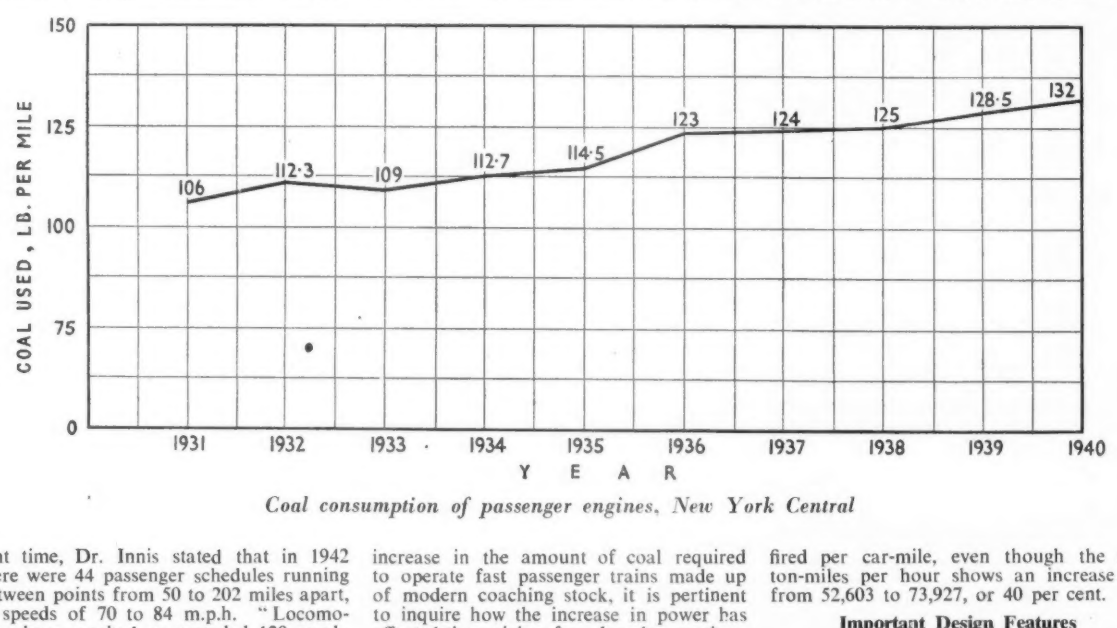
The foregoing indicates how the power of engines has increased, and how the operating of heavy trains at high sustained speeds puts a considerable demand on the power output of modern locomotives. These high powers are not obtained for nothing.

Although the thermal efficiency of locomotives has improved, the coal required per mile is continually rising, and the accompanying graph has been prepared to show how the amount of coal required per mile to handle fast passenger trains on the New York Central System between Harmon, N.Y., and Chicago has increased from an average of 106 lb. per mile in 1931 to 132 lb. per mile in 1940. These figures apply to all classes of passenger engines, and to both summer and winter workings. They further include all coal loaded on the tenders, and thus cover all locomotive purposes.*

Referring to the high powers developed by present-day locomotives, and to the increase in the amount of coal required to operate fast passenger trains made up of modern coaching stock, it is pertinent to inquire how the increase in power has affected the weight of modern locomotives, and what use do these powerful engines make of the coal loaded on the tenders? These questions may be answered by referring to a paper read before the American Society of Mechanical Engineers in 1941 by Mr. P. W. Kiefer, Chief Engineer, Motive Power & Rolling Stock, New York Central System.†

It is learned from this that, when the "Pacific" 4-6-2 type passenger engines were first introduced in 1904 for a maximum of 1,700 i.h.p. attained at 39 m.p.h., the engine-only weight per i.h.p. was 132 lb., and that 567 i.h.p. was developed per axle. These engines, without the tender, weighed 224,000 lb. Taking the latest six-coupled express engines of the modified "Hudson" type, the 4-6-4 engines, class "J3," of 1937, which can develop 4,725 i.h.p. at 75 m.p.h., the engine weight is 360,000 lb. and the weight per i.h.p. only 76 lb., while the power developed per axle has increased to 1,575 i.h.p. It has been shown that the coal required per mile has increased during the ten years 1931-1940 by some 23 per cent. What, it will be asked, is the coal consumption in relation to the work done? Dynamometer car tests are carried out on the New York Central with new locomotive designs as delivered to determine the maximum power available at capacity operation, and also the consumptions of coal and water resulting under normal working conditions.

We will refer to some results which indicate how modern engines use the coal supplied. The latest engines of the Pacific type introduced in 1925, class "K5," when tested with a 15-car train of 1,053 tons at 51 m.p.h., used 7.22 lb. of coal per car-mile. Taking for comparison the latest 4-6-4, class "J3," engines of 1937, a train of 18 cars weighing 1,253 tons was operated, at 59 m.p.h., on a coal consumption of 6.21 lb. per car-mile. This is a reduction of 14 per cent. in the coal fired per car-mile, even though the net ton-miles per hour shows an increase of from 52,603 to 73,927, or 40 per cent.



Coal consumption of passenger engines, New York Central

Important Design Features

The principal design features that have contributed to the high powers possible with modern locomotives and to improved operating results will now be considered. Boiler steaming capacity is the first essential, and another governing factor is cylinder design, particularly with respect to the arrangement and proportioning of the steam and exhaust ports and passages. In regard to boilers, probably nothing has done more to augment capacity than the four-wheel trailing truck. This has enabled the use of larger boilers with large grate areas without unduly loading the coupled axles.

An examination of the dimensions of a representative 4-8-2 engine, period 1922-1925, shows that grate areas varied within the limits of from 66 to 88 sq. ft., with a mean dimension of about 75 sq. ft. For modern 4-8-4 engines built from about 1930, grate areas are found to range from 73 up to 107 sq. ft.; on the assumption, therefore, that steaming capacity is proportional to the size of the grate, 4-8-4 engines may be at least 40 per cent. more

* "The Last Fifty Years—And the Next." Speech by Dr. J. B. Innis at a dinner celebrating his fiftieth anniversary with the American Locomotive Company. New York. December 11, 1945

* "Progress in Steam Passenger Locomotive Utilisation," by A. A. Raymond, Superintendent, Fuel and Locomotive Performance, New York Central. American Society of Mechanical Engineers, 1941

† "Modern Steam Passenger Locomotives: Research and Design," by P. W. Kiefer, American Society of Mechanical Engineers, 1941.

powerful than those of the 4-8-2 type. While boiler capacity has been augmented to obtain the power required, large cylinders and high pressure steam must be employed.

In the case of two-cylinder engines, designers are faced with two real problems, namely, adequate steam and exhaust ports, and motion design. Two major points are the weight of the reciprocating masses, the reduction of the dynamic augment (hammer blow) at high speeds, and the loading imposed on main crank pins. From the point of view of boiler capacity, mention should be made of the practically universal use of feed-water heaters, mechanical stokers, and the small tube E-type superheater. So far as the engines are concerned, cast-steel bed frames, with cylinders included, and the large use now being made of roller-bearing journal boxes, should also be noted. The application of roller bearings to main and coupling rod pins is also increasing.

DIMENSIONS AND PROPORTIONS OF MODERN AMERICAN LOCOMOTIVES

Railway	Pennsylvania	N.Y.C.	R.F. and P.	Southern Pacific	N.Y.C.	B. and M.	D.T. and I.	B. and L.E.	P. and W.V.	Southern Pacific	Union Pacific	C. and O.
Type	4-4-4-4	4-8-4	4-8-4	4-8-4	4-6-4	4-8-2	2-8-4	2-10-4	2-6-6-4	4-8-8-2	4-8-4	2-6-6-6
Service	Passenger	Passenger and Freight	Passenger and Freight	Passenger	Passenger	Freight	Freight	Freight	Freight	Passenger and Freight	Freight	Freight
Cylinders—No., dia. and stroke, in.	4 19½×26	2 25½×32	2 27×30	2 25½×32	22½×29	2 28×31	2 25×30	2 31×32	4 23×32	4 24×32	4 23¾×32	4 22½×33
Valves, dia., in.	Poppet	14	12	—	14	14	14	15	12	11	12	12
Coupled wheels, dia., in.	80	79	77	80	79	73	63	64	63	63½	68	67
Rated tractive force, lb.—												
Main cylinders	65,000	61,570	66,500	64,760	43,440	67,000	63,250	96,700	97,500	123,000	135,375	110,200
Booster	—	—	—	13,000	12,100	—	—	13,100	—	—	—	—
Boiler—												
Evaporative heating surface, sq. ft.	4,218	4,827	5,374	4,887	4,187	4,544	4,493	5,903	5,914	6,468	5,889	7,240
Superheater	1,680	2,060	2,093	2,086	1,745	1,924	1,795	2,487	1,873	2,601	2,466	3,186
Combined	5,898	6,887	7,467	6,973	5,932	6,468	6,288	8,390	7,787	9,069	8,355	10,426
Grate area, sq. ft.	91·3	100·1	96·3	90·4	82	79	88·3	106·5	102·3	139	150	135·2
Working steam pressure, lb. per sq. in.	300	275	275	300	275	240	250	250	225	250	300	260
Wheel base, ft.—in.—												
Coupled wheels	25—4	20—6	20—0	21—6	14—0	19—3	16—9	22—4	32—7	44—7	36—6	34—8
Engine	51—11	48—5	47—0	47—8	40—4	44—2	39—3	45—6	55—8	67—3	72—5½	62—6
Locomotive	107—0	97—2½	97—2½	96—3	83—7½	92—8	86—1½	95—2½	98—3½	111—9	117—7	112—11
Weights, lb. and tons (2,240 lb.)												
On coupled wheels	268,200	275,000	277,245	275,700	196,000	269,400	248,600	371,000	394,040	514,800	540,000	471,000
,, ,, ,,	119·8	122·8	123·8	123·0	87·5	120·01	110·9	165·5	175·7	229·8	241·04	210·2
Do. Average per pair	67,050	68,750	69,311	68,622	65,330	67,350	62,150	74,200	65,673	64,912	67,500	78,500
,, ,, ,,	29·9	30·65	30·9	30·7	29·16	30·0	27·72	33·12	29·3	28·7	30·13	35·04
Total engine	497,200	471,000	466,040	475,000	360,000	416,100	411,500	519,840	525,980	639,800	762,000	724,500
	222·0	209·8	208·0	212·0	160·7	185·1	183·0	232·0	234·3	285·0	340·0	322·2
Locomotive	930,200	891,000	842,940	788,730	674,300	785,000	772,870	901,340	894,130	1,028,700	1,104,200	1,150,600
	415·2	397·7	376·3	352·0	300·1	350·04	334·0	403·0	395·2	459·2	492·9	512·6
Tender—												
Water, gallons, U.S.	19,500	18,000	20,000	23,300	14,000	20,000	22,000	23,000	20,000	22,000	24,000	25,000
Coal, tons (2,000 lb.)	41	46	22	Oil, 5,880 galls.	30	21	22	25	25	Oil, 6,100 galls.	28	25
Ratios—												
Superheater heat. surface, per cent. comb.	28·5	29·5	28·0	29·5	29·4	29·8	36·3	29·6	24·1	28·7	29·5	30·6
Evap. heat. surface/grate area	46·2	48·1	55·8	54·0	51·06	57·5	50·8	55·3	57·6	65·0	55·6	53·5
Weight on coupled wheels per cent. total engine	54	58·4	59·5	58·0	54·45	64·7	60·5	71·5	75·0	80·1	71·0	65·1
Weight on coupled wheels, ÷ R.T.F.	4·13	4·4	4·17	4·25	4·51	4·02	3·92	3·83	4·04	4·17	3·99	4·27
R.T.F./grate area	712	615·7	687	715	529·8	847	715	905	950	885	906	815
R.T.F./evap. heat. surface	15·4	12·78	10·42	13·2	10·38	14·7	14·05	16·3	16·4	19·01	16·0	15·2
R.T.F.×dia. of driving wheels, evap. heat. surface	1,231	1,009	952	1,060	817	1,075	887	1,048	1,035	1,205	1,100	1,021
Superheater type	A	E	E	E	E	E	E	E	A	E	E	E

NOTE.—All locomotives fitted with feed-water heaters, and all have stokers, except the S.P., which burn oil. Weight of S.P. 4-8-4 includes tender two-thirds loaded or others tenders fully loaded. B. and L.E. 2-10-4. Full gear cut-off 68·75 per cent. M.E.P. for R.T.F. 80 per cent.

Examples of Modern Locomotives

The principal dimensions of selected examples of modern locomotives for passenger and freight services are given in the accompanying table. The examples illustrated include engines having wheel arrangements commonly found in recent practice, and the ratios of proportion show how these different wheel arrangements affect the weight distribution, and also the relation between boiler capacity as measured by the grate areas and evaporative heating surfaces and engine power expressed in terms of rated tractive force. Except those using oil as fuel, all the locomotives mentioned are coal burners using bituminous coal, having a calorific value ranging from approximately 13,000 to 14,000 B.Th.U. per lb.

It is now intended to comment on the different designs as given in the table of dimensions. The first example is a four-cylinder engine intended for fast passenger traffic, built for the Pennsylvania by the Baldwin Locomotive Works, two of which were placed in service during 1942 and are now being followed by a further 50, of which 25 are to be constructed by Baldwins and 25 at Altoona.* In this design the cylinder power is divided by using two separate four-coupled two-cylinder units in one main frame. The engines, therefore, in effect are equivalent to an eight-coupled design. Such being the case, these and the New York Central class "S1b" 4-8-4 engines built by the American Locomotive Company may be compared, and thus bring out certain characteristic features of four- and two-cylinder engines intended for high-speed traffic.

The Pennsylvania engines have a rated tractive force of 65,000 lb. and the N.Y.C. 61,570 lb. in this respect; therefore, they are much alike. On the testing plant at Altoona, one of these 4-4-4-4 type engines developed a maximum of 6,552 i.h.p. at 360 r.p.m., equivalent to 86 m.p.h. This power output is equal to 1,638 i.h.p. per axle and to an engine weight only of 75.7 lb. per i.h.p. The total weight of the reciprocating parts on one side of the engine is 1,992 lb., an average of 996 lb. per cylinder. The New York Central engines have been designed to develop not less than 6,300 i.h.p. at speeds of from 75 to 80 m.p.h., and they have two cylinders which are, in consequence, much larger. The results of an extensive series of trials understood to have been carried out during the spring of this year are not yet known to the writer, but judging from the performance of previous N.Y.C. eight-coupled engines, there is little doubt that they will easily develop the desired power output.

On this assumption, therefore, the engine-only weight per i.h.p. would be 74.75 lb., and 1,575 i.h.p. would be developed per axle. The weight of the reciprocating parts per cylinder is 1,547 lb., 25 per cent. of which is balanced. The respective maximum piston thrusts are, for the Pennsylvania engines, 91,500 lb., and for the N.Y.C., 140,000 lb. The load on the main crank pins due to piston thrust is 9,150 lb. in the case of the Pennsylvania engines, but for the N.Y.C., as the main and coupling rod assemblies are of the tandem type, the load due to piston thrust is reduced by one-half, and, therefore, becomes 70,000 lb.

The Pennsylvania engines are equipped with the Franklin poppet valve gear, and each cylinder has eight poppet valves, four at each end, and of these two 5 in. valves are for admission and two 6 in. diameter are for exhaust. The N.Y.C. engines have 14 in. piston valves and the Baker gear. The cylinder ports have an area of 53.2 sq. in., but the maximum area through each valve bushing is 90.4 sq. in., or 169 per cent. of the port area. At short cut-offs, this gives a large area to steam through the valve bushings in relation to

* "High-Speed Locomotives for the Pennsylvania Railroad." *The Railway Gazette*, April 5, 1946

the area of the port between the bushing and the cylinder, and presents an excellent feature. At 50 per cent. cut-off, the area through the valve bushing is 30.5 sq. in., or 57 per cent. of the cylinder port area.

Both engines have Timken light-weight connecting, coupling, and piston rods, the latter having light steel pistons and underhung cross-heads of the multi-ledge type, with aluminium-alloy cross-head shoes. The piston rods are hollow, and roller bearing assemblies are applied to all crank pins, and also fitted in the cross-heads for the cross-head pins. The Baker valve motion in the case of the N.Y.C. locomotives is fitted with needle bearings; anti-friction bearings are used for the Franklin gear; Timken roller bearings are applied to all engine and tender axles.

In considering the relative weights of the reciprocating parts, while these may not be exactly comparable, they are reasonably so, because the Franklin poppet valve gear is operated by a system of levers similar to the union and combining levers of the Baker valve motion. In each case, the main framing consists of a unit steel casting by the General Steel Castings Corporation, which includes the cylinders with valve chambers complete. The N.Y.C. engines have a large grate area, and to provide a commensurate gas area through the tubes and flues, the diameter of the boiler has been made as large as the loading gauge will allow for an engine of this type having driving wheels of a size desirable for high-speed operation.

The outside diameter of the barrel next to the round top firebox is, in consequence, 100 in., and the net gas area is 10.57 sq. ft. As it has not been possible to use a dome, a steam-collecting pipe is fitted in the upper part of the barrel which connects with the multiple-valve throttle in the superheater header. The working steam pressure is 275 lb. per sq. in., though the boilers have been designed to carry a steam pressure of 290 lb. per sq. in. if later considered necessary. At the latter pressure the factor of safety would be 4½. The tender wheel arrangement has been designed to provide as short a wheel base as possible, so that the locomotive may be turned on the standard 100 ft. tables. They have an improved quick-acting water scoop designed to pick up water at high speeds, and the tank, which is specially vented, has a capacity for 18,000 U.S. gal., which on account of trough spacing is found to be ample.

Water and Coal Capacity

The relatively small amount of water carried has made it possible to provide a bunker capacity for 46 short tons of coal, which permits of the 925 miles run between Harmon, N.Y., and Chicago being made with heavy trains with only one refilling of the coal bunker. The first of these engines, known as the "Niagara" class, was delivered early in 1945, and during the months of August and September of that year ran a total of 52,525 miles, hauling the "Commodore Vanderbilt" express made up of from 14 to 16 Pullmans at a mean speed of 56 m.p.h., and is reported to have made light work of it.

These locomotives have been designed with a view to intensive utilisation, and are equally suitable for fast passenger and freight services. A rather extended reference has been made to these two locomotives, which are interesting as illustrating two different methods of approach to the problem of providing steam locomotive power for adequately handling the heaviest and fastest passenger services in the world. In design and construction both reach a stage in the development of the reciprocating steam locomotive as yet unsurpassed.

The two following examples of 4-8-4 type engines show, respectively, a design built by Baldwins for both fast passenger and freight traffic on the Richmond Fredericksburg and Potomac, and a semi-streamline design constructed for the Southern Pacific for fast passenger service by the Lima Locomotive Works. These are excellent examples of modern construction. Both designs include type E superheaters and one-piece cast-steel frames, feed-water heaters, power reverse gears, and stokers in the case of the R.F. and P. engines; those for the S.P. use oil fuel. The S.P. engines are used to haul the "Daylight" fast trains between San Francisco and Los Angeles, loading up to 14 cars and weighing about 924 short tons. The New York Central 4-6-4 engines, 50 of which were built during 1937 and 1938 by the American Locomotive Company, are a good example of modern six-coupled engines for fast passenger service.*

The design is based on the original Hudsons of 1927, but has been much improved. These engines have 22½ in. by 29 in. cylinders with 14 in. valves, and the steam pressure is 275 lb. per sq. in. The engines and tenders run on roller bearings. They have a fine record of performance in fast traffic between Harmon, N.Y., and Chicago and other points.

Average Monthly Mileages

During 1941 these 50 engines averaged monthly almost 15,000 miles per engine, while individual monthly mileages have been as high as 24,000. Between classified repairs they have made as much as 250,000 miles.† For freight traffic the Boston and Maine have in service some large 4-8-2 type engines built by Baldwins. They have one-piece cast-steel frames which include the cylinders and the boilers—which are of nickel steel except for the back plates—and tube plates and inner firebox carry a working pressure of 240 lb. per sq. in. The thickness of the plates used and the design of the longitudinal boiler seams are such that the factor of safety is 4½ at a steam pressure of 250 lb. per sq. in. The cylinders have 14 in. valves which receive a full gear travel of 7½ in. from the Walschaerts valve gear. The engine front trucks have Timken roller bearings and the tenders have Isothermos journal boxes. Feed-water heaters are fitted, and mechanical stokers.

For freight traffic 2-8-4 type engines are much in evidence. They are more powerful than those of the 2-8-2 design, for although the adhesive weight and cylinder tractive effort is much the same, the boiler capacity is increased due to the large fireboxes and grate areas made possible by the four-wheeled trailing truck. The example illustrated on page 270 is a design due to Lima for the Detroit, Toledo & Ironton Railroad and is interesting in that the engine frames are machined from rolled-steel slabs similar to the bar type of framing as made by locomotive builders here. The writer was to some small extent responsible for this development in the U.S.A. It will be noted that these engines have a grate area of 88.3 sq. ft., comparing with 79 sq. ft. in the case of the B. & M. 4-8-2 engines.

The Bessemer & Lake Erie 2-10-4 locomotives built by Baldwins represent a development of the 2-10-2 or Santa Fe type formerly much used for heavy moderate speed freight service. The engines illustrated are a good example of the 2-10-4 design and are used to handle very heavy trains. In this instance, the main frames are not of the single-unit type, but are made up of the usual cast-steel side members to which the cylinders of cast iron in two saddle pieces are bolted, and at the hind end they are bolted to a cradle casting.

The equipment includes the type E superheater, feed-water heater, mechanical stoker, and three syphons. The booster is of the limited cut-off type. When compared with the preceding examples of the 2-8-4 design, it will be seen that the four-wheel truck, together with the additional coupled axle, has enabled a much larger boiler to be used and a grate of sufficient size to ensure a reasonably high evaporation per sq. ft. of evaporative heating surface. It will be noted that the heating surface grate area ratio is 55.5 to 1. These engines have a rated tractive effort of 96,700 lb., and the booster makes this up to 109,600 lb. available at starting and low speeds. The engines are thus equal in tractive effort to articulated locomotives of average capacity.

Other examples cover simple expansion Mallet articulated engines with different wheel arrangements. The Pittsburgh and West Virginia 2-6-6-4 is a relatively small engine of approximately equal power to the B. & L.E. 2-10-4 previously mentioned. A comparison between the weights of these engines will indicate how the articulated design provided the same tractive force and boiler capacity with much lighter unit loading of the coupled axles. During recent years the Southern Pacific have placed in service a number of large Mallet-type engines for handling both passenger and freight trains on heavy-grade sections of the line. These are of the 4-8-8-2 types, and as the illustration on page 271 shows, run with the firebox and cab leading, an arrangement made possible by the use of fuel oil in place of coal.

In conformity with present-day practice, the main frames for each of the power units consists of a one-piece casting which includes the cylinders, and other equipment includes the type E superheater, a feed-water heater, and Walschaerts valve gear operating 11 in. valves and controlled by a power reverse gear. In accordance with standard practice, the compressed-air brake is fitted, and for the engines in question there are two 8½ in. cross-compound compressors which, as is frequently the case, are carried by brackets on the smokebox front. The tractive force reaches the high figure of 123,000 lb.

The Union Pacific 4-8-8-4 locomotives built by the American Locomotive Company have already been fully described in *The Railway Gazette*,* but as no record of recent construction could be considered complete without a reference to these remarkable engines, their dimensions are included in the table and a photograph of one of them is reproduced on page 271.

The concluding example of articulated locomotive and one of the latest design is seen in the 2-6-6-6 engines built by Lima for the Chesapeake & Ohio. These and some others recently built by Lima for the Virginian are the only engines to have this particular wheel arrangement. The

(*Continued on page* 277)

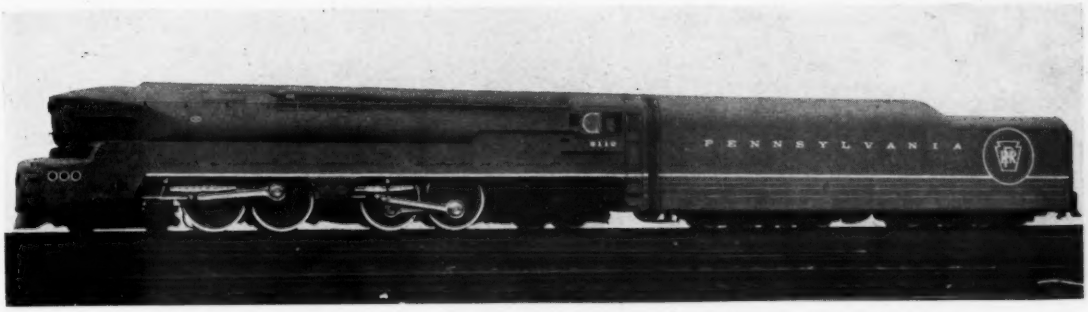
* "Improved 4-6-4 Locomotives for the New York Central." *The Railway Gazette*, May 27, 1938

† A.R.E.A. Report of Committee on "Railway Location and Operation." Chairman, L. K. Silcox, 1946

* "A Remarkable American Locomotive Development" *The Railway Gazette* January 30, 1942

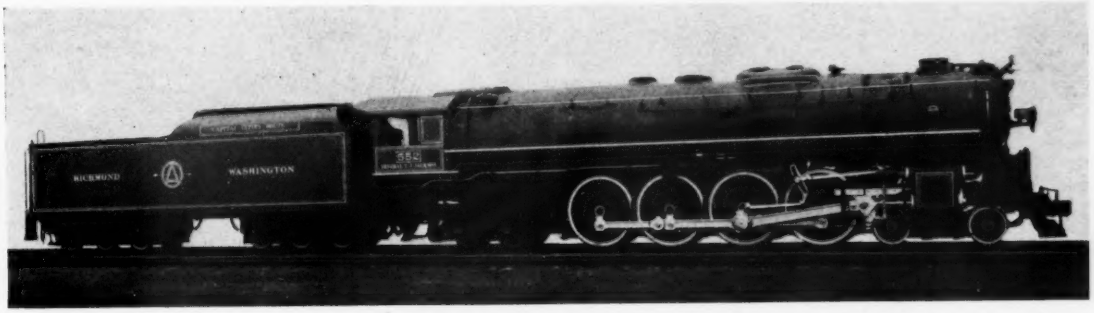
XUM

Modern American Locomotives

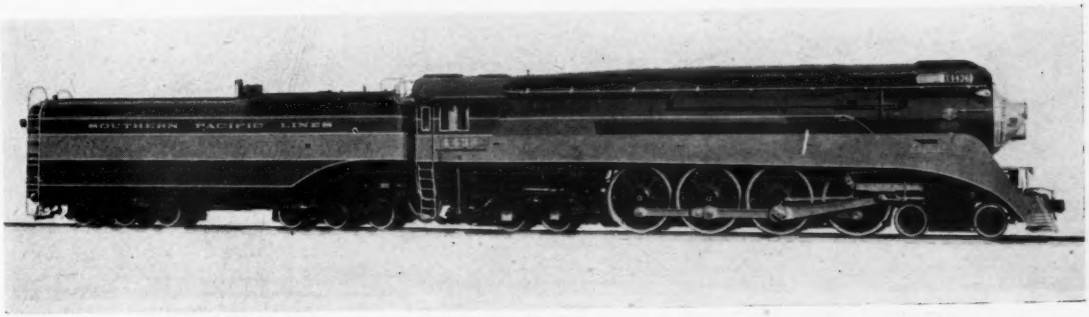


Pennsylvania 4-4-4-4 *type locomotive for fast passenger service, class* "T1," 1942

New York Central 4-8-4 *type locomotive for fast passenger and freight service, class* "S1b," 1945

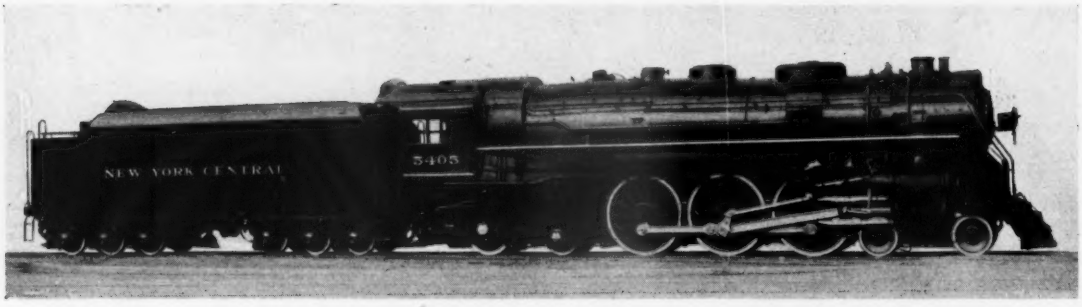


Richmond, Fredericksburg & Potomac 4-8-4 *type locomotive for fast passenger and freight service, class* "551-555," 1936

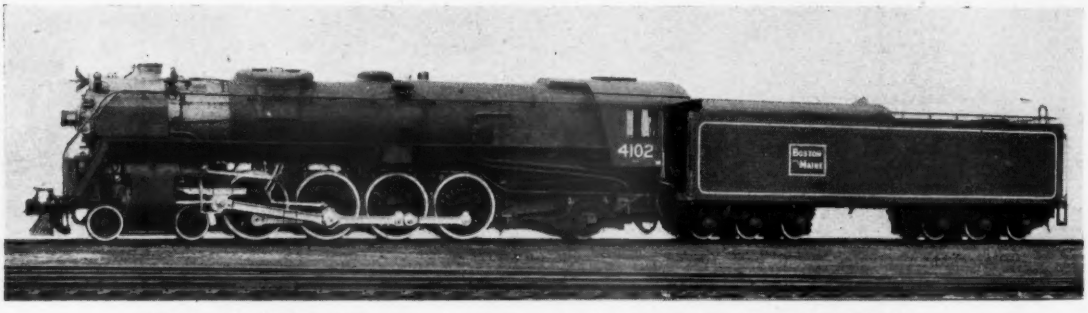


Southern Pacific Lines 4-8-4 *type locomotive for fast passenger service, class* "GS4"

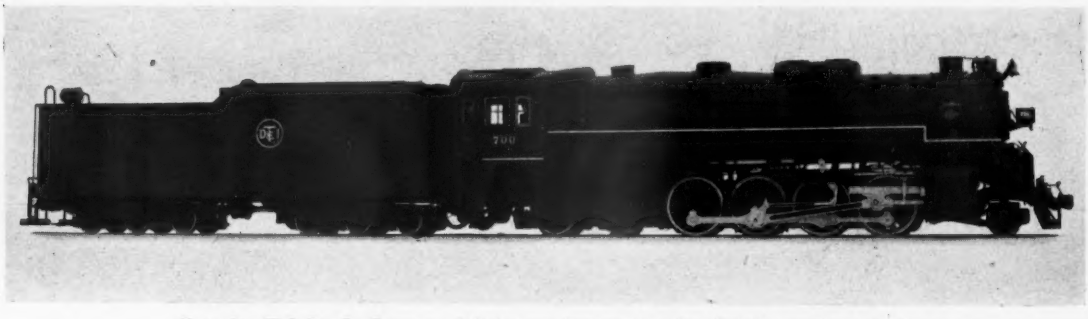
Modern American Locomotives



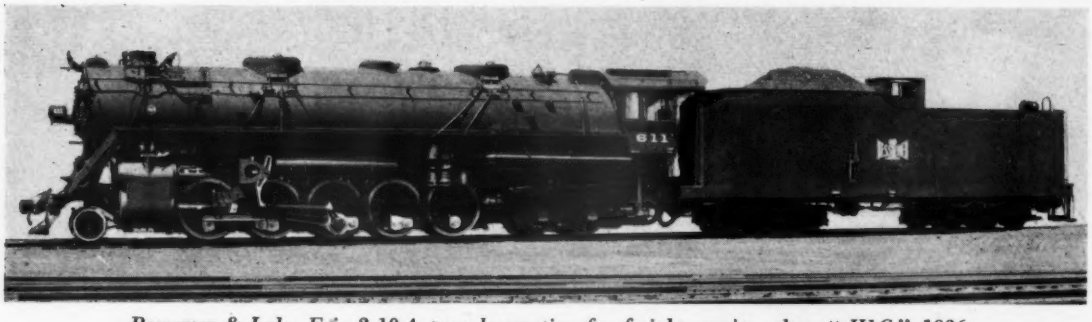
New York Central 4-6-4 *type locomotive for fast passenger service, class "J3A,"* 1937



Boston & Maine 4-8-2 *type locomotive for freight service, class "R1A,"* 1935

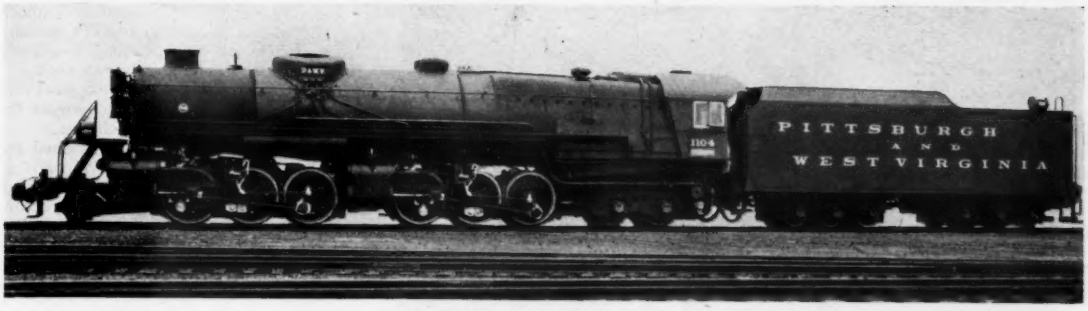


Detroit, Toledo & Ironton 2-8-4 *type locomotive for freight service,* 1936

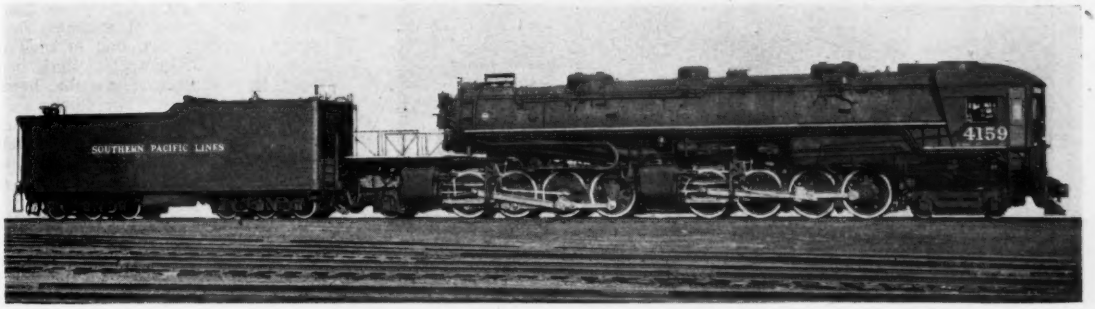


Bessemer & Lake Erie 2-10-4 *type locomotive for freight service, class "H1C,"* 1936

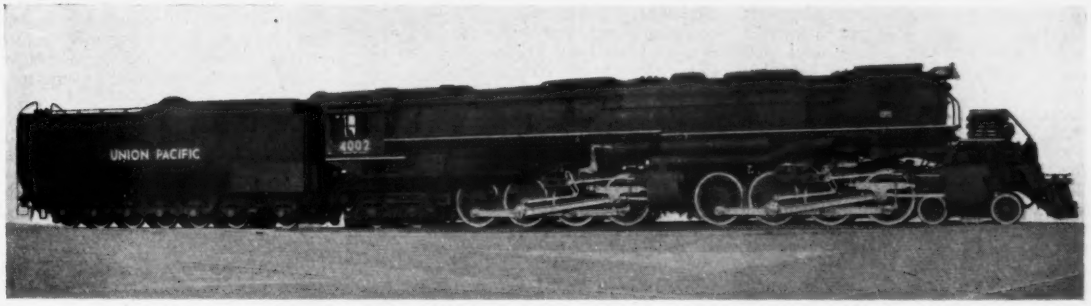
Modern American Locomotives



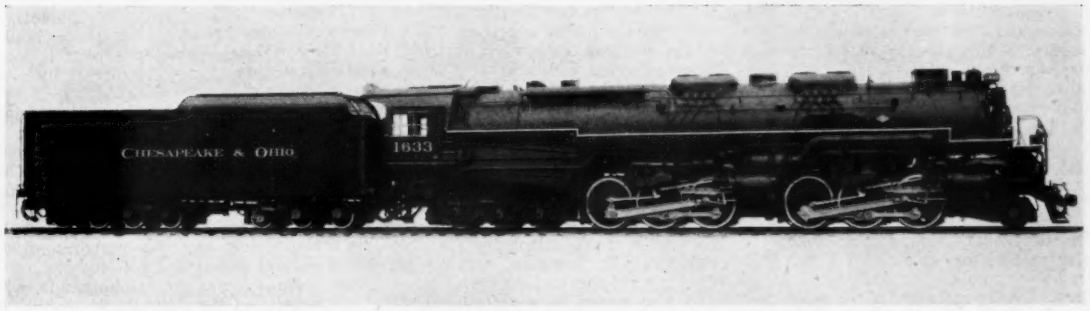
Pittsburgh & West Virginia 2-6-6-4 *Mallet-type locomotive for freight service,* 1937



Southern Pacific lines 4-8-8-2 *Mallet-type locomotive for passenger and freight service, class "AC7,"* 1937



Union Pacific 4-8-8-4 *Mallet-type locomotive for freight service,* 1941



Chesapeake & Ohio 2-6-6-6 *Mallet-type locomotive for freight service, class "H8,"* 1942

Engineering Library

Training Centre for L.N.E.R. Clerical Staff

A permanent residential school at Hadley Wood for training Southern Area staff in goods and passenger station practice and telecommunication

Students learning telephone geography from a wall chart

THE first railway school of its kind, St. Ronans, Hadley Wood, Herts., which was formally opened by Sir Ronald W. Matthews, Chairman of the company, on August 22, has been equipped by the L.N.E.R. as a permanent residential training centre for its Southern Area staff. As was reported in our last issue, students at St. Ronans receive practical instruction in goods and passenger station work and accounts, and in every type of telecommunication used on a railway system.

The centre has accommodation for 24 students; 20 at a time will attend the courses in station practice, each lasting a fortnight, and four will train in telecommunication work, the length of the period depending on the speed at which individual proficiency is attained. Although new entrants to the service will attend, the majority of the students for some time will be ex-servicemen and women undergoing refresher courses.

In an airy lecture room the 20 students sit at individual desks of the office type. The room has plenty of natural light and is also provided with fluorescent illumination and controllable tubular heating. A feature of this room is an experimental glass blackboard. Constructed of satin-finished plate glass, it is illuminated from within by reflected fluorescent light, giving a flat white ground. Black wax crayons are used for writing. When not illuminated the board serves as a screen for use with a film-strip projector.

Booking Offices in the Annexe

Practical work is done in an annexe to the main building, in which are two full-size, fully-equipped booking and parcel offices. One is a replica of the traditional type of office, with a booking window let into a solid front, and the other is an office of the latest type, with a clear-glass front and booking counter of modern design, and an internal public counter for inquiries and parcel despatch. The ticket-issuing equipment, consisting of Bellmatic ticket containers, a Rolltic machine, and a dummy Zone-Ticket Printer with operating panel, have been provided by the Bell Punch Co. Ltd., Uxbridge.

Also in the annexe is the most modern railway telecommunication school in the country, covering every phase of railway telephone, telegraph, and teleprinter operation, and consisting of two fully-equipped stations known as Ajax and Beta. In station Ajax there is a training telephone switchboard equipped with all types of circuit encountered at a railway exchange. It has lamp calling circuits with associated multiple packs, eyeball indicators, and drop indicators, as well as plunger-type keys for ringing on omnibus circuits, each serving a number of stations, signal boxes, yards, etc. Various supervisory indications are available on the switchboard, and a special unit has been incorporated for the training of blind operators.

Close by the switchboard is the control desk, from which the instructor can make practice calls to the student, by whom they are received as though the calls had been made by the public over Post Office lines, or by railway callers in internal lines. The instructor can hear the reply given by the student and watch his action; this visual-aural supervision enables prompt correction of operating errors to be made. To provide practice for operators in giving standard replies, the instructor can, by asking the student for certain numbers, regulate the type of reply.

An illuminated mural diagram, showing the main trunk telephone routes within the L.N.E.R. Southern Area, is used to demonstrate the various switching centres, and also serves as a refresher course in railway geography. The diagram is operated from the control desk by plunger keys, one for each station on the diagram. Each switching point shows red when lighted, and the station name, illuminated from behind, appears in black letters on a white opal ground.

Three single-needle telegraph circuits work between stations Ajax and Beta, and although only a few yards separate them, the stations might be miles apart, for students are able to carry out all necessary station-to-station procedure, and yet be available for immediate supervision. There is a teleprinter in each station; both can be used by students for self-practice, or, by switching, Ajax can send to Beta. The Ajax machine can also work into the main L.N.E.R. teleprinter network through the Liverpool Street exchange.

The proficient stage is reached by easy steps. In the first place, there is a large wall replica of a telegraph instrument, which is operated by the instructor from his control panel, the class calling out each letter as recognised. Secondly, a dummy instrument, responding to operation, but not connected to a circuit, is available for individual practice. Thirdly, the instructor can switch in to one or all of the active instruments on the live circuits, and provide practice messages at controlled speeds.

The code timing of messages is taught by two large clocks, one in each of the two stations. The special dials bear the code letters as well as the hour and minute indications. The clocks are operated by the instructor from his control panel, and the hands can be revolved quickly to skip from hour to hour, or they can be made to move from minute to minute.

Eight text booklets cover each of the station work and accounts courses. On the first evening after his arrival at the school, the student is given the first booklet to read through in order that he may gain a broad view of the subject matter covered.

He makes notes about items not clear to him, and on the following day the instructor covers in detail the material in the booklet, illustrating his lecture and writing notes on the glass blackboard, or by showing specimens by means of the film-strip projector.

Sequence of Practical Work

Then practical work is done as a class on actual railway forms, which leads through the course in logical order from the small, initial stages of the work to the climax, namely, the striking of a station balance sheet.

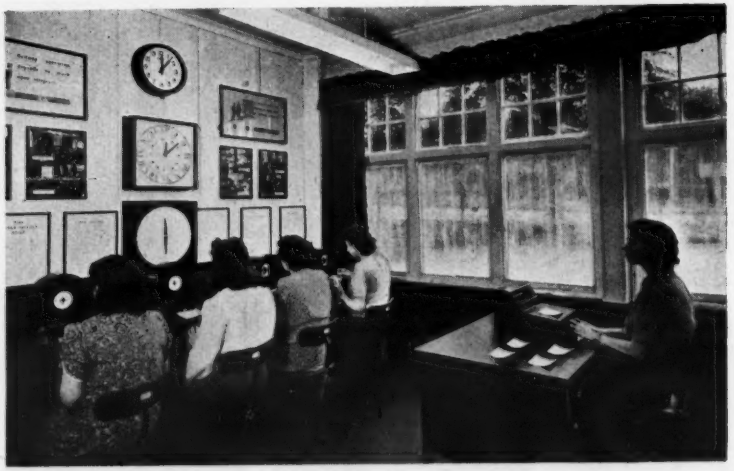
The text-booklets reduce the need to take notes, but practical examples are dictated as necessary. Booklets, note sheets, etc., are kept in a special binder supplied to the student; upon completion of the course, he takes back with him to his station the binder and its contents, which constitute a useful reference book. In the training syllabi provision is made for discussion and lectures by visiting speakers.

The centre was adapted and equipped entirely by L.N.E.R. staff. Mr. R. J. Eaton, head of the Passenger Department Research Station, Mr. E. A. Clayton, Telecommunications Controller, Southern Area, and Mr. H. Crank, Goods Manager's Office, Southern Area, were largely responsible for the preparation of the lectures and courses of study.

Apart from the teaching side, which is supervised by Mr. E. S. Hobbs, Senior Instructor, the welfare of students is also looked after adequately; they have the use of a comfortable lounge, library, large garden, etc., admirably suited to recreational purposes or informal discussion; there is also a sick bay in case of need.

XUM

Training Centre for L.N.E.R. Clerical Staff



Miss M. Forsyth taking a class in station Ajax

Mr. E. A. Clayton advising students in station Beta

The modern booking office provided at St. Ronans

Mr. H. S. Hobbs explains the working of the old type of office

Training Centre for L.N.E.R. Clerical Staff

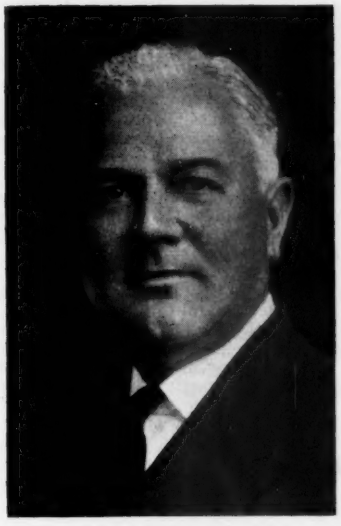
Students' dining room at St. Ronans Training School, Hadley Wood

Mr. E. S. Hobbs, Senior Instructor, taking a class of ex-servicemen in station practice

RAILWAY NEWS SECTION

PERSONAL

Mr. J. R. Pike, Assistant Chief Commercial Manager, L.M.S.R., has been appointed a Director of Cumberland Motor Services Limited and East Midland Motor Services Limited. Mr. H. G. N. Read, General Assistant to Chief Commercial Manager, L.M.S.R., has been appointed a Director of the Eastern Counties Omnibus Co. Ltd. and West Yorkshire Road Car Co. Ltd. Mr. A. Jessop, Assistant (Outdoor) to Chief Commercial Manager, L.M.S.R., is joining the board of the Lincolnshire Road Car Co. Ltd., and has been appointed a member of the management committee of the Eastern National Omnibus Co. Ltd.



Mr. C. W. Powell

Appointed Divisional Superintendent, Swansea, G.W.R.

Mr. C. W. Powell, Operating Assistant to Superintendent of the Line, Paddington, Great Western Railway, who recently was appointed Divisional Superintendent, Swansea, entered the company's service in 1915 in the Office of the Superintendent of the Line. In January, 1918, he joined H.M. Forces; he served in the Inns of Court O.T.C. and in the R.A.F. until March, 1919, when he returned to the Passenger Train Section of the Office of the Superintendent of the Line. In July of the same year he was transferred to the Divisional Superintendent's Office, Swansea, to gain station and divisional experience, and he remained there until 1923, when he returned to the Rates & Fares Section of the Office of the Superintendent of the Line. From 1925 to 1934, Mr. Powell was attached to the Passenger Train Working Department, and in the latter year became a passenger train runner. From October, 1935, until August, 1936, Mr. Powell acted temporarily as an Assistant to the Divisional Superintendent at Paddington; and in August, 1936, he was appointed Chief Clerk to the Divisional Superintendent at Worcester. In June, 1938, he was transferred to the Bristol Division as Chief Clerk to the Divisional Superintendent; and in April, 1940, he became Assistant Divisional Superintendent at Paddington. Mr. Powell was appointed Assistant to Superintendent of the Line, Paddington, in April, 1942, and Operating Assistant to Superintendent of the Line in June, 1945.

Lord Courthope has been appointed a Director of the Clerical, Medical & General Life Assurance Society. He is a Director of the Southern Railway Company.

Sir Frederick Handley Page (President of the Institute of Transport) has been appointed an Officer of the Legion of Honour.

Mr. D. Murray, Assistant Goods Manager, North Eastern Area, L.N.E.R., who, as recorded in our August 16 issue, has been appointed Mineral Manager, Southern Area, was educated at Derby

Mr. D. Murray

Appointed Mineral Manager, Southern Area, L.N.E.R.

School and Jesus College, Oxford, and joined the L.N.E.R. in 1924, as a traffic apprentice. After occupying posts in the Middlesbrough District Goods Manager's Office and in the Goods & Passenger Managers' Staff Section at York, he was appointed, in 1930, Staiths Superintendent at the Hartlepools. In 1931, he became Dock Superintendent at the St. Andrew's Docks, Hull, and in 1935, Goods Agent, Hull. Mr. Murray was appointed Assistant District Goods Manager, Newcastle, in January, 1939, and from the outbreak of war acted as District Goods Manager there until November, 1940, when he was transferred to Hull in the same capacity. In January, 1943, he was appointed to act as Assistant Goods & Passenger Manager, North Eastern Area; and he was made Assistant Goods Manager for that area in April, 1945, continuing also to act as Assistant Passenger Manager until October, 1945. Mr. Murray is the son of Mr. John Murray, O.B.E., who, when he retired in 1932, was Assistant Chief General Superintendent, L.M.S.R.

SOUTH AFRICAN RAILWAYS & HARBOURS

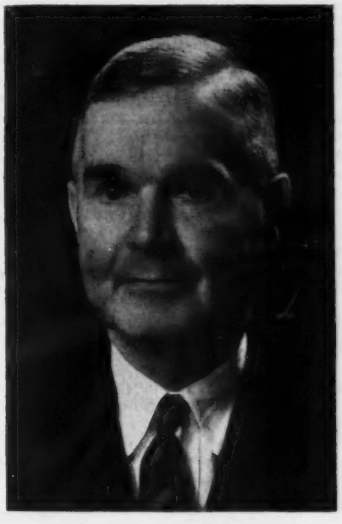
Mr. J. O. Paterson, System Engineer, Eastern Transvaal System, has been appointed to the newly-created position of Civil Engineer (Special Duties), Chief Civil Engineer's Office, Johannesburg.

RHODESIA RAILWAYS

Mr. F. W. Bain, Principal Assistant to the General Manager, has retired.

Mr. J. H. Allen has been appointed Rates Assistant to the General Manager, in succession to Mr. W. J. Speller, who has retired.

Mr. M. D. Thompson, who, as recorded in our August 2 issue, has been appointed District Goods & Passenger Manager, Cambridge, L.N.E.R., has been acting in that capacity since July, 1944. He commenced his railway career with the North Eastern Railway, and gained general experience at stations in the Middlesbrough and Darlington districts as a relief clerk and as Relief Stationmaster.



Mr. M. D. Thompson

Appointed District Goods & Passenger Manager, Cambridge, L.N.E.R.

After periods of duty in different sections of district and headquarters offices, he held appointments successively as Head of Staff Section, District Goods Manager's Office, Leeds (Southern and North Eastern Areas); in charge of the Joint Staff Sections of the District Goods Manager and District Passenger Manager, Newcastle-on-Tyne; as Chief Clerk to District Goods Manager, Manchester; as Deputy Chief Rates Clerk, Goods Manager's Office, Southern Area; and as Assistant District Goods & Passenger Manager, Cambridge; before his appointment as Acting District Goods & Passenger Manager, Cambridge. In the war of 1914-18 Mr. Thompson saw service in France with the Royal Engineers and the Loyal Regiment, and eventually was given a commission with the West Yorkshire Regiment.

Mr. W. S. Scott, Works Superintendent, and Mr. H. G. Gradwell, Sales Manager, Darlington Forge Limited, have been appointed Special Directors of the company.

Awards are announced in the Fifth Supplement to *The London Gazette*, dated August 16, under the heading of Canada—Department of Transport, of the Imperial Service Medal, to 212 railway employees; and of the Imperial Service Medal to one employee of the Ceylon Government Railway.

XUM

Mr. Stanley Gairns, Publicity Department, L.P.T.B., has been appointed Advertising Production Officer of British European Airways Corporation. Mr. Stanley Gairns is the son of the late J. F. Gairns, some time Editor of *The Railway Magazine*, and he started his railway career in the Commercial Manager's Department of the late Metropolitan Railway.

We regret to record the death on August 25, at the age of 84, of Lt.-Colonel Sydney Belfield, C.B.E., late R.A., who was Assistant Director of Railway Transport for a period during the war of 1914-18.

PRESENTATION TO MR. R. J. ARMSTRONG

Representatives of all departments of the Great Western Railway met at Worcester recently to present a farewell gift to Mr. R. J. Armstrong, the former Divisional Locomotive Superintendent there, who retired last April. Mr. Armstrong's grandfather, Joseph Armstrong, was a contemporary of Robert Stephenson, and was Locomotive Superintendent, G.W.R., 1864-77. Mr. G. W. Robson, Assistant Divisional Locomotive Superintendent, who presided, and Mr. J. J. Membery, Electrical Assistant, who made the presentation, spoke of the regard and affection in which Mr. R. J. Armstrong was held by all his staff and associates. The ceremony was attended by:—

Messrs. J. A. Warren-King (a former District Goods Manager, Worcester) now District Goods Manager, Birmingham; A. V. R. Brown, Divisional Superintendent, Birmingham; J. F. M. Taylor, Divisional Superintendent, Worcester; C. H. Adey, District Goods Manager, Worcester; W. E. Walling, Sheet & Stores Department Superintendent; C. L. Simpson, Divisional Locomotive Superintendent, Newport; J. Colclough, Assistant Divisional Locomotive Superintendent, Newport; and A. Sheppey, Assistant Divisional Superintendent, Gloucester (representing Mr. R. H. B. Nicholls, Divisional Superintendent, Gloucester).

Messrs. J. F. M. Taylor, C. H. Adey, C. L. Simpson, W. E. Walling and A. Sheppey spoke in support, and they and members of Mr. Armstrong's indoor and outdoor staff expressed the wish that Mr. Armstrong should have a long and happy retirement. Acknowledging the gift, Mr. Armstrong said how deeply he appreciated the co-operation he had received from officers and staff of his own and other departments, and referred to his long family connection with the railway.

We regret to record the death on August 26 of Mr. W. W. Darcy, Divisional Chemist, Crewe, L.M.S.R.

Mr. Asaf Ali has received the portfolio of Communications (War Transport & Railways) in the new interim Government in India.

L.M.S.R. STAFF CHANGES

Mr. W. E. Yates, Assistant Road Motor Engineer, Watford H.Q., to be Road Motor Engineer, Watford H.Q., in place of Mr. J. Shearman, retiring.

Mr. V. R. B. Cooke, Assistant to Road Motor Engineer, Watford H.Q., succeeding Mr. W. E. Yates as Assistant Road Motor Engineer, Watford H.Q.

Mr. D. Chaddock, Inspector, Road Motor Engineer's Department, Watford H.Q., to be Assistant to Road Motor Engineer, Watford H.Q.

Mr. G. Lovelady, District Operating Manager, Leeds, to be District Operating Manager, Leicester.

Mr. F. J. Hibbert, Assistant District Operating Manager, Leeds, succeeding Mr. G. Lovelady as District Operating Manager, Leeds.

Mr. W. A. G. Suddaby, Assistant District Operating Manager, Birmingham, to be Assistant District Operating Manager, Leeds.

Mr. G. K. Tatterson, Yardmaster, Edge Hill, to be District Controller, Crewe (Basford Hall), in place of Mr. G. R. Parker, retiring.

Mr. E. Chilton, Yardmaster, Garston, succeeding Mr. G. K. Tatterson as Yardmaster, Edge Hill.

Mr. G. Cherrington, Assistant Yardmaster, Crewe, to be Yardmaster, Garston.

Mr. L. M. Sayers, District Controller, Peterborough, to be Assistant District Operating Manager, Leicester.

Mr. F. Bateman, Head Office Inspector (Freight Services), Office of Divisional Superintendent of Operation, Derby, to be Assistant to District Operating Manager, Leicester (located Peterborough).

Mr. I. Parkes, Assistant District Controller, Wigan, to be Assistant to District Operating Manager, Liverpool (located Wigan).

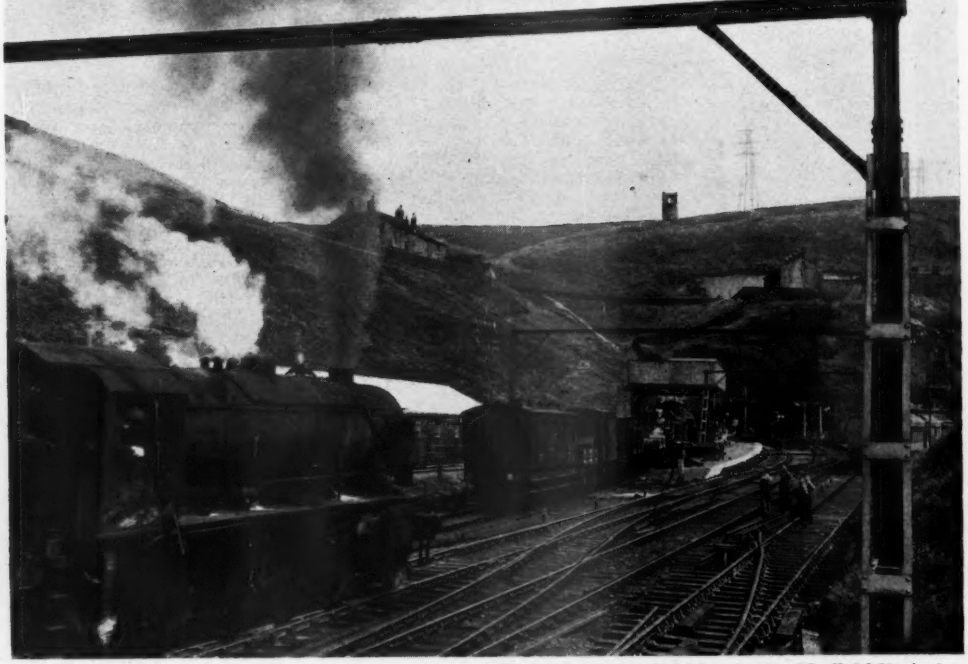
Mr. S. W. Hughes, Goods Agent, Willesden, to be Goods Agent, Commercial Road, in place of Mr. G. H. Hayday, retiring.

Mr. G. Butterworth, Chief Booking Clerk, Liverpool (Exchange), to be Passenger Agent, Wigan, in place of Mr. P. Hetherington, promoted.

Mr. H. A. Went, Yardmaster & District Inspector, Bristol, to be Yardmaster & Stationmaster, Bristol (St. Philips).

Mr. H. E. Rock, District Foreman, Carriage & Wagon Department, Wigan, to be District Foreman, Carriage & Wagon Department, Accrington, in place of Mr. W. R. Ellis, retiring.

Relining in Woodhead Tunnel, L.N.E.R.



Woodhead Station, L.N.E.R., at the west portal of Woodhead Tunnel (Manchester-Sheffield line), in which, as recorded in our last week's issue, relining work has been commenced

Photo] ["The Manchester Guardian"

Douglas High-Lift Truck and Stillage System

A newcomer to the range of industrial power trucks is the High-Lift model, made by the firm of Douglas (Kingswood) Limited, Bristol, which presents several novel features, one of which is that the truck will lift its load to any height not exceeding 4 ft. 8 in., thus enabling goods to be loaded on lorries at floor height.

The lifting mechanism is engine driven, and is operated from the driving seat of the truck through a single lever control, the scissors members (shown in the right-hand illustration below) forming part of the raising and lowering mechanism, ensuring an even distribution of support for the load at all stages of lift by eliminating any overhanging weight.

Motive power for ground traction and for raising and lowering the platform is provided by a Douglas flat twin engine, and both power unit and truck are manufactured at the Kingswood works, which enables spares and advice on maintenance to be obtainable from one source.

The Power Unit

The power unit is a horizontally opposed twin-cylinder, side-valve engine of 596 cc. capacity, designed for easy starting, even in the coldest weather, and as air is employed as the cooling medium, the engine can be operated successfully under extremes of climatic conditions. The power unit is completely cowled-in, and the ease with which the canopy can be removed gives ready access for maintenance purposes.

The arrangement of transmission enables the truck to be reversed by the simple process of rotating the steering wheel through 180 deg. without rotating the power unit itself. The position of the driver, in front of the truck, gives an unimpeded view on all sides, an advantage where confined spaces and narrow gangways exist. At the side of the engine canopy, and within easy reach of the driver, is the lever controlling the upward and downward movement of the platform. An upward pull on the handle raises the platform and a downward push lowers it.

The lifting mechanism has several points of interest. Immediately to the rear of the power unit, behind the oil and petrol tank, are two steel channel-section vertical members, each secured rigidly to its respective main chassis member by a gusset plate. At their upper ends, these two uprights are joined by a cast-duralumin cross-piece to which they are bolted, and between the uprights is a steel square-threaded screw, the rotation of which imparts movement to the platform.

At its upper end, the screw runs in a spherical self-aligning ball-bearing carried in the cross-piece, and at its lower end is connected to a gearbox, through which it is driven by disc couplings between which is interposed a Hardy flexible disc. A long sleeve nut is threaded over the screw and is attached to the platform itself. At each end it is provided with special seals to prevent the lubricant escaping to the threads of the screw. Similar sealing arrangements are employed for the bearing at the upper end of the screw and for the one in the gear box. The self-aligning features ensure maximum steadiness and smoothness of lift, and the design of the bearings takes care, also, of any thrust loads. All moving parts are lubricated by splash from oil contained in the gear box itself.

On the model shown, the High-Lift platform is made of stout-gauge sheet steel carried on longitudinal girder members. Beneath the platform, and supporting it at all stages of lift, are two pairs of scissor members, provided with forged end fittings.

A characteristic of the platform is its quick response to movement of the operating lever. With the platform empty, a check was made to ascertain the shortest time taken to raise it from the full down position to the maximum height, which proved to be 20 seconds. The check was then repeated with the maximum recommended load of one ton in position, and 20 seconds was again recorded.

A useful feature is a trip-rod arrangement which throws the clutch into neutral and arrests the upward movement of the platform as soon as it reaches its maximum lift position or any predetermined intermediate position. Alterations to the setting can be made when necessary by slackening a securing screw and re-setting the position of an adjustable collar on the trip-rod. The clutch is thrown into neutral when the surface of the platform comes in contact with the underside of the collar.

One factor contributing to an efficient mechanical handling system is the elimination of wasted time due to a truck being kept idle during loading and unloading. The stillage system involves the employment of as many stillages as necessary, distributed at points where loading operations take place. The stillages are loaded as the work proceeds, and then collected by an elevating-type truck (shown in the left-hand illustration below).

The use of stillages also considerably increases the carrying capacity of the trucks, which can be operated almost continuously provided an adequate number of stillages is available, and almost any kind of product or material can be handled by suitably designed stillages and trailers. An added advantage when the stillage is loaded with cases stacked one on the other is that the platform can be raised progressively to the height most convenient for each layer.

Modern American Locomotives

(*Concluded from page* 268)

C. & O. locomotives have been built to handle heavy freight trains on the steep Allegheny grades and to develop maximum continuous power output at speeds varying from 30 to 35 miles per hour. The power units have cast-steel unit frames embracing the cylinders, which are 22½ in. by 33 in. and have 12 in. valves actuated by the Baker motion. The pistons are of cast steel, and the piston rods, connecting and coupling rods are of medium carbon steel. The crossheads are of the underhung multi-ledge design.

The weight of the reciprocating parts for each cylinder is 2,152 lb., of which 41.7 per cent. is balanced. The working steam pressure is 260 lb. per sq. in., so that the maximum piston thrust works out at 102,600 lb. It is interesting to compare these weights with those for the N.Y.C. 4-8-4 engines having alloy steel heat-treated motion, which for a piston thrust of 140,000 weighs 1,547 lb., or 28 per cent. less for a piston loading 37 per cent. greater. Naturally, in making such a comparison it must be kept in mind that the N.Y.C. engines are intended for fast running, whereas the Mallet engines are chiefly for comparatively low speeds.

The fittings include a superheater of the E type, a multi-valve throttle integral with the header, a power reversing gear, and mechanical stoker. A Worthington feed heater is also included, and Timken roller bearing journal boxes are used for the coupled axles. The design as a whole is in keeping with modern standards. In conclusion, reference must be made to a new Duplex engine of the 2-4-6-4 type, put into freight traffic by the Pennsylvania.

The writer is indebted to the American Locomotive Company, the Baldwin Locomotive Works, the Lima Locomotive Works Inc., and to Mr. P. W. Kiefer, Chief Engineer, Motive Power & Rolling Stock, New York Central System, for the photographs reproduced with this article.

A Douglas High-Lift truck picking up a stillage loaded ready for collection

A loaded truck elevated to its maximum height of 4 ft. 8 in.

Staff & Labour Matters

Compulsory Trade Union Membership

Some three months ago employees of the London Passenger Transport Board at New Cross Depot, who are members of the Transport & General Workers' Union, refused to work with other employees at the depot who are members of the National Passenger Workers' Union, which was formed after the London bus strike in 1937, and the Board continued these men on the pay-roll without working. Arising out of this incident, discussions have taken place between the London Passenger Transport Board and the Transport & General Workers' Union, and, after a meeting on August 26, the Board decided not to continue in its service any employee in grades covered by agreements with the T.G.W.U. who is not a member of that Union.

BOARD'S STATEMENT

In a statement issued by the Board explaining its reasons for that decision, it states that from 1933 the Board made all its agreements and conducted all negotiations in respect of the operating and maintenance staffs of its road services with the Transport & General Workers' Union, and that those agreements applied without exception to each and every employee in the grades concerned. In 1938 the National Passenger Workers' Union was formed, and some of the Board's employees became members of it. The Board did not recognise it, nor enter into any agreement with it. The Transport & General Workers' Union, which represented an overwhelming majority of its employees, had now informed it that they would not work with employees who were not members of their Union. "The Board," continues the statement, "has decided that the existing unsatisfactory situation which, by seriously hampering the Board in its efforts to provide an efficient transport service, is prejudicial to the public, must be brought to an end. It is recognised by the general executive council of the Transport & General Workers' Union that it is essential to the fulfilment of the Board's duties to the public that the Board should be able to rely on the observance of collective agreements and the full co-operation of the staff.

"On this basis, and on the understanding that an opportunity will be given to all non-members of the Transport & General Workers' Union to join that Union, the Board has decided not to continue in its service any employee in the grades concerned who is unwilling to join the Transport & General Workers' Union."

N.P.W.U. STATEMENT

After that announcement, the National Passenger Workers' Union decided to apply for an injunction to prevent the London Passenger Transport Board from giving effect to the notices issued to the tram drivers and conductors who have remained idle since May 27 because of the refusal of the Board's employees, members of the Transport & General Workers' Union, to work with them. The following statement was issued on August 27 on behalf of the executive council of the National Passenger Workers' Union:—

"The national executive council at its meeting tonight discussed the decision of the London Passenger Transport Board to change the terms of employment and to make one section of its employees subject to the closed shop. We, the National Passenger Workers' Union, a registered trade union democratically controlled, understand and believe in the principle of democracy that the rule of the majority shall prevail. In the present instance, tram and bus men have not been given an opportunity of expressing their views on the closed shop. The decision has been taken by Transport House, without regard to the members' wishes. The executive council of the N.P.W.U. would have accepted the decision of a ballot vote taken by the T.G.W.U. and/or the L.P.T.B. We have pressed for this throughout the whole of this issue. No ballot of any kind has been taken. We therefore cannot accept the dictates of Transport House and we are resolved to fight the Board and the T.G.W.U. To this end an injunction is to be applied for to restrain the Board from giving effect to the notices to the 12 men. In the event of any of our members being discharged the executive council will afford them all protection legally. We advise our members not to be intimidated by the threat from the L.P.T.B. and to remain loyal to the N.P.W.U., being assured the union is doing all in its power to protect its members' interests; and whatever the outcome of this struggle may be the N.P.W.U. will still carry on."

T.G.W.U. STATEMENT

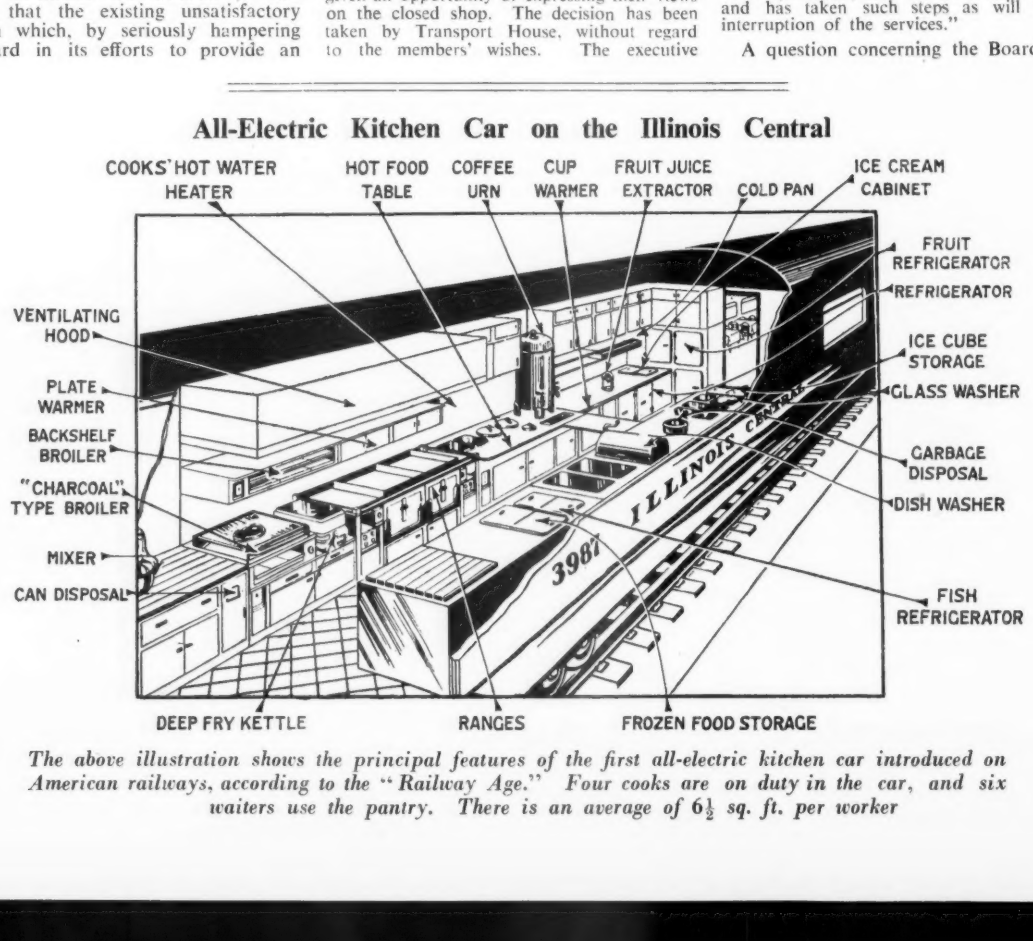
Mr. Arthur Deakin, General Secretary of the T.G.W.U., also issued a statement on August 27 as follows:—

"The executive of the Union today met the committees of the three sections of the membership of the Union employed by the L.P.T.B. in the operative and maintenance grades, and full consideration was given to the implications of the statement issued by the Board yesterday. Arrangements have been made for a fully representative conference, comprising the delegates and branch secretaries of the three sections, for Thursday, when a full report will be given and steps taken to give effect to the issues involved.

"The Union wishes to make it perfectly clear that every opportunity has been given over a long period of time and every effort made to bring non-members into the Union. The opportunity to become members of the Union still remains, and it is to be hoped and expected that those outside the Union at this time will take steps immediately to join up. The Union is deeply conscious of its responsibility to the travelling public, and has taken such steps as will prevent interruption of the services."

A question concerning the Board's em-

All-Electric Kitchen Car on the Illinois Central



The above illustration shows the principal features of the first all-electric kitchen car introduced on American railways, according to the "Railway Age." Four cooks are on duty in the car, and six waiters use the pantry. There is an average of 6½ sq. ft. per worker

ployees who were being stood off work was raised in the House of Commons on July 30 by Mr. W. J. Brown (Rugby—Ind.), who asked the Minister of Labour "whether he has reconsidered the case of the twelve L.P.T.B. tramwaymen, who, while drawing their pay regularly, are not allowed by the L.P.T.B. to take out their trams on the grounds that they are members of one Union and not members of another; and whether he will make a statement of his intentions."

Replying to a supplementary question arising out of the above question, Mr. Ness Edwards, Parliamentary Secretary to the Ministry of Labour, stated that it was an inalienable right on the part of the workers in industry to decide with whom they would work. They had that freedom, and those men had decided that, unless the other men concerned joined their union, they would withdraw their labour, as they were perfectly entitled to do if they so desired.

The question of compulsory trade union membership was the cause of an unofficial strike at Stratford, L.N.E.R., Locomotive, Carriage & Wagon Works recently, when some 4,000 men refused to work because two men who were not members of a trade union were employed. The strike was of very short duration and ended with one of the men joining the Union and the other man, who was 66 years of age, resigning his job.

Compulsory trade union membership was discussed at the annual conference of the National Union of Railwaymen in July, when the resolution was passed:—

"That this annual general meeting, whilst recognising the efforts of this Union for joint action with the other railway trade unions on the non-unionist question, are satisfied that the time has arrived when definite action must be taken. We therefore instruct the General Secretary to inform the A.S.L.E.F. and R.C.A. that this Union is proceeding with an immediate application to the railway companies that trade union membership shall be a condition of employment in the railway service as from June 29, 1947."

Transport Problems in South Africa

Planning passenger transport facilities for the Cape Peninsula so as to cope with passenger traffic in fifty years' time, is one of the tasks before the Cape Peninsula & Districts Urban Transport Committee, now hearing evidence in Cape Town.

Graphs prepared by the committee show that passenger traffic over the three suburban electric railway lines of the Peninsula has risen from under 20 million passengers in 1919 to about 78 million in the year ended March last. Because of war conditions 18 million more passengers were carried in 1943 than in 1941. Since 1943 there has been a consistent, although not sharp, rise in traffic. Between 7.30 a.m. and 8.30 a.m. on weekdays about 31,000 people travel on the electric trains. At 5.30 p.m. about 36,000 are handled, and at 1 p.m. about 13,000.

The committee will obtain similar information on peak periods from the road passenger transport companies in the Peninsula. It is now studying principles adopted in other countries to solve the problem of coping with passenger traffic at peak hours.

Apart from the census forms which were distributed to the public through employers, the railway administration took, between May 17-20, what is probably the most comprehensive census ever made on the volume of traffic on each of the three suburban electric lines. Over those four days the average number of passengers arriving at and leaving Cape Town station daily was between 133,000 and 139,000—nearly 70,000 in each direction. In the transport census which is being carried out among members of the public, forms already returned cover about 70,000 school children and about 40,000 daily workers.

The committee, it is stated, already has sufficient evidence to show that Cape Town lacks the necessary transport facilities to handle its passenger traffic adequately and efficiently. In drawing up its report to the Minister of Transport, the committee will give careful consideration to the needs of Cape Town's new foreshore area and to opportunities for providing arterial roads, parking areas, and other amenities.

Apprentice Training at a Huddersfield Works

As far back as 1912 the firm of David Brown & Sons (Huddersfield) Ltd. made its first venture into apprentice training apart from instruction by the foremen, when a special training school was started separate from the works.

Although this original venture had proved successful, there was a weakness in that it stopped short at the point of practical work, and steps were then taken to remedy the deficiency by putting into operation a full plan of apprentice training in a department completely separated from the works organisation.

At the present time, directed by a training officer assisted by a specially trained staff, manual work alternates with classroom instruction, and most of the practical work carried out is put to commercial use, because it was found that apprentices working metal which they knew was destined for the salvage bin, lost interest in the work.

The apprentices are required to take mutually agreed courses at evening classes, and in certain cases in day classes, in which event the school fees are borne by the company and the boys are paid full wages. Last year the firm paid some £360 in awards for examination successes.

Victorian Railways Locomotives to Burn Oil

Fifty-seven steam locomotives of the Victorian Railways are being converted to oil burning at the rate of five a week. Those already converted are of the "A2" class, and are running now between Melbourne and Ararat, Bendigo, and Geelong. Later, the "C" class will be converted.

Oil storage depots, each with a capacity of from 36,000 to 72,000 gal., are being established at North Melbourne, Ballarat, Ararat, and Geelong. The locomotive fuel tanks hold 1,500 gal., sufficient for a return journey without refuelling from Melbourne to Ararat, Bendigo, Benalla, or Sale.

To obtain the required firebox volume and length of flame, the burner has been mounted at the forward end of the ashpan. The grate is replaced by a steel floor on which there is a two-inch refractory lining with six openings supplying air. Against the back plate of the firebox a wall is provided up to the level of the bottom of the firehole, and firebrick side walls are fitted to a line about on a level with the foundation ring. The length of the brick arch has been reduced by a row of bricks.

Conference on London Traffic and the London Plan

Various plans have been prepared for the rebuilding of London, but so far there has not been sufficient scientific examination of the essential difficulties of combining the vision of architects with the practical needs of travel, and in the hope that these questions can be usefully discussed, the British Association for the Advancement of Science has arranged a two-day conference in London.

At this conference, which will be held at the Institution of Civil Engineers, Great George Street, London, S.W.1, on September 12 and 13, speakers will include experts on the general problems of traffic, town planning, and architecture, and on the special problems of railways, tubes, and travel by air. Full details of the conference, which will be open to the

Apprentices in a Huddersfield Works

Apprentices of David Brown & Sons (Huddersfield) Ltd. receiving instruction in a well-lighted workshop

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public free of charge, may be obtained from the office of the British Association, Burlington House, Piccadilly, W.1.

Lord Latham, Chairman of the London County Council, will preside at the opening session at 10.15 a.m. on September 12, and the conference will be opened by Sir Richard Gregory, F.R.S., President of the Association. Other speakers at this session will include Sir William Halcrow, President of the Engineering Section of the Association, and Professor W. G. Holford, who was responsible jointly with Dr. Holden for "The New Plan for the City of London."

Among the speakers at the afternoon session will be Mr. V. A. M. Robertson, formerly Engineer-in-Chief, London Passenger Transport Board, and now Chief Civil Engineer, Southern Railway, and Mr. J. C. Martin, Assistant Engineer (Tunnelling), London Passenger Transport Board. The morning session on September 13 will be for discussion.

French Rail Transport of Fruit and Vegetables

The French National Railways Company (S.N.C.F.) devotes special attention to the cultivation of fruit and vegetables in the chief production centres of France, supervising also packing and storage for transport and distribution to Paris and other large cities, and export to foreign countries. To give representatives of the French and foreign press some insight into the methods of collection and transport, the S.N.C.F. recently organised a four-day tour of the Rhone Valley, one of the richest production areas in the country.

Almost the entire output in the Rhone Valley is sent to market by rail. In 1931 the railways dealt with 430,000 tons. Ten years later, despite the war, the amount had risen to 485,000 tons, the figure comprising 172,000 tons of fruit and 313,000 tons of vegetables. This year the total is likely to exceed any previous record.

Packing in baskets and crates, and loading in wagons and vans, are carefully carried out in compliance with the S.N.C.F. regulations to ensure transport and delivery in the market in good condition. Refrigerator vans are largely employed for fruit. Vans undergo refrigeration in cold storage depots, and about two tons of ice are placed in each van to maintain a low temperature during a long journey. Many vans are built to the English loading gauge.

Under the guidance of M. Texte, Chief Inspector of the S.N.C.F. Commercial Service, the press party visited the refrigeration stations at Valence and Lyons. The Lyons depot has a cold storage capacity of nearly a million cubic feet, where all kinds of produce may be stored at temperatures varying from −20° C. to 20° C. A quick-freezing plant provides for the storage of fruit in the season of greatest production, for consumption in January, February, and March. There is also a centre for the hiring of vans and their preliminary refrigeration. Ice is produced at the rate of 150 tons a day, sufficient to supply not only the needs of the depot, but also those of Lyons and other towns.

Similar stations exist already at Toulon, Avignon, Valence, Lyons, Dijon, Strasbourg, and Perpignan. Others are to be built at Toulouse, Limoges, Niort, Caen and Rennes. In addition, the S.N.C.F. uses special sets of vans equipped with refrigerating plant as mobile units.

Many trains of fruit traffic are made up in the special marshalling yard at Chasse, near Lyons. These trains, generally of fewer than 40 wagons, at present run at speeds of 65 to 75 km.p.h. (40 to 47 m.p.h), but the speed is to be raised as soon as circumstances permit. The new 2-8-2 "R" class locomotives, recently imported from the United States, are generally used.

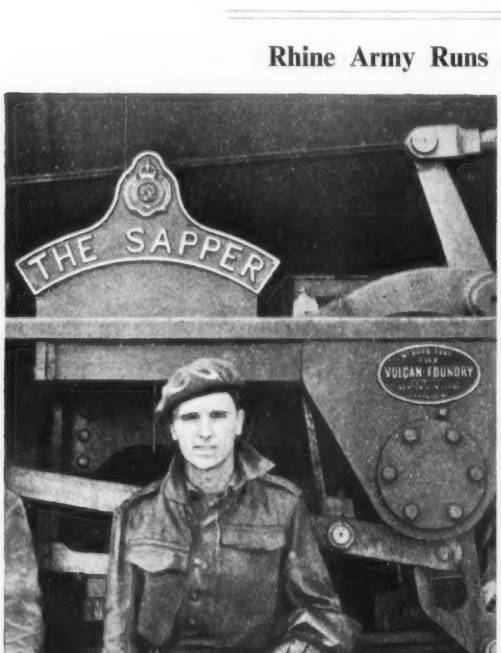
Chasse deals not only with the produce of the Rhone Valley, but also with that from the Roussillon, the country around Perpignan in the eastern Pyrenees, and fruit and vegetables imported at Marseilles. In May alone this year Chasse despatched 14,000 wagons of fruit and vegetables out of a total of 25,660 wagons dealt with.

Swiss Federal Railways Half-Yearly Receipts

When preparing their budget for 1946, the Swiss Federal Railways envisaged an unfavourable balance of fr. 25,600,000. The Swiss Federal Council, viewing the position in the light of reviving international passenger and goods traffic, amended the budget by increasing the estimated working receipts by fr. 24,000,000, the budget thus showing an unfavourable balance of fr. 900,000.

According to the accounts for the first six months of 1946, the working receipts of the Swiss Federal Railways exceed those of the same months of 1945 by

Rhine Army Runs a Training Railway



Vulcan Austerity locomotive "The Sapper" used for training purposes

Detmold signal box operated by 153 Railway Operating Company, R.E.

Sappers with world-wide experience are teaching men of the new army in Germany to operate railways under any conditions, and they are doing this on a 48 km. stretch of line between Herford and Himminghausen, which is part of the main German railway network. The school is operated from Detmold by 153 Railway Operating Company, R.E., and the Company transports all kinds of traffic, including normal German goods and passenger services and U.S. freight trains on their way to the American zone. Every trade necessary for railway operation is taught in courses varying from six to eight weeks

fr. 48,000,000, that is, by double the amount of the amendment introduced by the Federal Council. The working surplus attained in the first half of 1946 amounts to fr. 94 million, exceeding by approximately fr. 37,000,000 that reached in the same period of 1945. It is thus assumed that the 4 per cent. interest on the working capital (fr. 400,000,000) of the Swiss Federal Railways has already been secured for the current year, and that the Confederation will obtain a sum of fr. 16,000,000 from the Federal Railways.

The position for 1947 is viewed with less optimism, and it is generally believed that an increase in the wartime fare increases introduced on April 1, 1944, will prove unavoidable. It is expected that the increases will be fixed in such a way as to enable the fast train supplements to be abolished. This would be a boon to the public, and result in simplifying the work of the ticket offices. It is thought that the additional use made of fast trains over short distances resulting from the abolition of supplements would not prove excessive.

New Works at Cape Town

No time has been lost by the South African Railways & Harbours Administration in pushing ahead with its part of the scheme for the development of the new foreshore area in Cape Town. Work on the new goods yard, which is now in progress, involves the building of nearly five miles of platform walls, the laying of 20 miles of track, and the erection of a goods shed. All the work must be carried out before it will be possible to vacate the present goods yards, which will become the site of the new passenger station (see *The Railway Gazette* of February 8).

Between the naval training base and the present marine drive, six platform walls, each 550 ft. long by 4 ft. 4 in. high, have already been built, and these are to be extended 900 ft. further on the city side. Over the whole terminal of platforms and tracks will be erected a goods shed measuring 1,450 ft. long by 400 ft. wide. Later, will come the goods offices, and the task of laying the network of railway tracks that will connect the goods yard with the main line beyond Koeberg Road Station. Beyond the Koeberg Road bridge some of the new tracks will join the main line at Woltemade No. 1. Others will connect with the new avoiding line which is to be built between Kensington and Bellville.

Preparing for Industrial Expansion

Mr. W. M. Clark, General Manager of Railways, stated in Durban recently that he expected a tremendous expansion of industry and agriculture in the next 10 years, and said that the railways would do all in their power to keep up with this expansion and stimulate it. The railways were facing great difficulties, but would play their full part. It was not only a question of wagons and locomotives, but of marshalling yards, station facilities, locomotive sheds, and staff. Apart from returned railwaymen, the administration had taken on 10,000 returned soldiers, but these men had to be trained and housed.

The shortage of rolling stock would be eased in September with the expected arrival of 1,500 wagons from Canada, and a slackening in the demand for coal after the winter months. An order for 1,000 wagons in South Africa had just been completed, and an order had been placed for 4,500 more in the next three years.

Notes and News

Cost-of-Living Index.—At August 1 the Ministry of Labour cost-of-living index figure was 105 points above the level of July, 1914, showing no change compared with a month earlier. At August 1, 1939, the cost-of-living index was 55 points above July, 1914.

Colonial Government Appointment.—An accountant is required by the Gold Coast Government Railway for one tour of 12 to 24 months with possible permanency. Candidates, not over 35, must have a thorough knowledge of bookkeeping, with practical experience in railway accounting work. See Official Notices on page 283.

Hoffmann Manufacturing Co. Ltd. Newcastle Office.—The Hoffmann Manufacturing Co. Ltd. has opened a branch office at 217, Westgate Road, Newcastle-on-Tyne, 1 (telephone: Newcastle 26608; telegraphic address: Hoffmann Newcastle). The branch is under the control of a qualified bearings engineer, and an emergency stock of ball and roller bearings will be carried.

Seed Potatoes By Rail.—For the present season's potato crop the L.M.S.R. and L.N.E.R. conveyed throughout by rail 258,000 tons of seed potatoes from Scottish farms to the potato-growing districts of England, an increase of 4,000 tons on the previous year. In addition, they carried more than 43,000 tons to Scottish ports for shipment to England by coasting vessels. The 301,000 tons of seed potatoes conveyed by rail should produce this year some two million tons of eating potatoes, a notable contribution to the nation's larder.

Restoration of Two L.N.E.R. Expresses.—Withdrawn in 1939, the "East Anglian," running between Liverpool Street and Norwich, and the "Yorkshire Pullman," running between Kings Cross, Doncaster, Hull, Leeds, and Harrogate, with connections to Bradford, will be reinstated on October 7 and November 4 respectively. The "East Anglian" will consist almost entirely of the luxury coaches which inaugurated the service in 1937. The "Yorkshire Pullman" will be made up of first and third class Pullman cars, and meals and refreshments will be served at every seat.

Design in Industry Conference.—The significance of design to the future of British industry will be stressed at the two-day conference to be held in the Central Hall, Westminster, London, S.W.1, on September 26 and 27 next. The conference, organised jointly by the Council of Industrial Design and the Federation of British Industries, will be presided over by Sir Thomas Barlow, Chairman of the Council of Industrial Design, and will be the first of a series of conferences to be held in association with the "Britain Can Make It" exhibition. On the first day (September 26), Sir Miles Thomas and the Hon. Josiah Wedgwood will speak on "Industry and the Designer"; Mr. T. P. N. Burness will speak on "Design and Machinery"; and other speakers will be Mr. E. Bruce Ball and Sir E. Raymond Streat, Chairman of the Cotton Board, whose subject will be "Design and Research," embracing market research and technical research. On the second day, Mr. Leslie Gamage and Mr. John Ryan will speak on the importance of design as an ally in sales; and Mr. Allan Walton and Mr. A. Whitaker on "Design Training"; and the title of the last session will be "A Programme for British Design," when principal speakers will be Sir Charles Tennyson, Chairman of the F.B.I. Industrial Art and Education Committees, and Mr. S. C. Leslie, Director of the Council of Industrial Design. The names of other speakers at the conference will be announced later. Delegates will include industrial designers and industrialists. Conference arrangements are in the hands of the Conference Secretary, Council of Industrial Design, Tilbury House, Petty France, London, S.W.1.

Darlington Railway Plant & Foundry Co. Ltd.—Trading profit for the year to April 30 was £16,729, and income from investments amounted to £274, making a total profit of £17,003. After provision for depreciation and taxes, a balance of £6,106 remained, out of which interim dividends of 2½ per cent. on the preference shares and 5 per cent. on the ordinary shares have been paid already, and £1,500 has been transferred to general reserve. The directors recommended final dividends of 2½ per cent. on the 5 per cent. non-cumulative preference shares, less tax, and 10 per cent. on the ordinary shares, less tax, making a total ordinary dividend for the year of 15 per cent., less tax.

Technical Press Delegation Visits Churchill Machine Tool Co. Ltd.—The following members of the Technical Press Delegation, which is touring this country as guests of the British Government, visited the Churchill Machine Tool Co. Ltd. on August 23: French: Mr. Jacques Dumas, Editor, *La Genie Civile*, and Mr. J. Charles, Editor, *La Metallurgie;* Dutch: Mr. J. J. Reynart, Editor, *Polytechnisch Tijdschrift*, and Mr. J. Roell, Editor, *De Ingenieur;* Swiss: Mr. Bernhard Marty, Editor, *Schweiz Werkmeister-Zeitung*, and Dr. Gawronsky, Editor, *Schweiz Metallarbeiter-Zeitung*. In a tour of the works they saw precision grinding machines of all types in course of construction.

L.N.E.R. Plans for Improved Cartage Services.—Schemes for the development of 16 railhead centres—three in England and thirteen in Scotland—embracing cartage services to 310 stations, the extension of cartage facilities, and the displacement of 437 horses by mechanisation, have been approved by the L.N.E.R. board. These proposals will call for a considerable strengthening of the company's present fleet of road vehicles, and 469 new motors and 1,205 new trailers are to be purchased at a cost of £400,000. The bulk of the additional motive units are to be 3-ton and 6-ton "mechanical horses," but the carriers will range from moving floor trailers, pole trailers, and stretcher pole trailers, to glass floats, end tippers, and livestock trailers. Orders exceeding £173,00 have been placed already for 292 motors of all types, as well as for 100 trailers, and 5 three-stall road horse boxes.

Dean & Dawson Limited.—An office of Dean & Dawson Limited at 131, Linthorpe Road, Middlesbrough, will be opened to the public on September 16; Mr. S. Taylor will be in charge. Mr. H. Dunn has relinquished the post of Branch Manager of the company's office at 81, Piccadilly, London, W.1, but remains Head of the Continental & Overseas Department at the same address; Mr. A. W. Cooke is now Manager of the Piccadilly branch. Mr. A. Wood, after many years' service,

has retired, and his place as Manager of the Lincoln office has been taken by Mr. W. Lawson, the pre-war Branch Manager at Rotherham. The company has re-opened its branch in Paris under the control of its pre-war Agent for France, Mr. L. F. Poirson; the address of the premises, which are at the corner of the Boulevard de la Madeleine, is 3, Rue Godot de Mauroy, Paris, 9; the telephone number is Opera 59.75-7, and the telegraphic address is Raildeadar.

I.C.I. Limited Transfers of Departments.—The departments of the Southern Region Sales Office of Imperial Chemical Industries Limited are all being transferred from Mill Hill to Gloucester House, 149, Park Lane, London, W.1 (telephone: Grosvenor 4020), at which address the Engineering Trades and Metals Departments of the company also are now located. The other departments at Mill Hill (Agricultural, Dyestuffs, Household Products, and Distribution, including Packages and Accounts) are scheduled to move on September 13 and 14.

Improvements at a Crewe Depot, L.M.S.R.—Improvements to be carried out by the L.M.S.R. at its permanent way stores depot at Crewe include the provision of a 7½-tons capacity magnetic electric crane capable of lifting six rails at a time, in place of two smaller cranes capable of lifting only one rail at a time. The new crane will operate on a ferro-concrete gantry 80 ft. wide and more than 300 ft. long, spanning a rail siding from which it will load or unload direct to or from the stacks of rails. An electric rail saw for cutting steel rails into any required length also is being installed as part of the improvement scheme.

Patents: "Licences of Right."—Notice is given in *The London Gazette* that applications have been made for the cancellation of the indorsements "Licences of Right" on the undermentioned patents:—

No. 523,124, dated December 23, 1938, in respect of variable electric resistance arrangements (grantee: English Electric Co. Ltd.).

No. 552,901, dated September 25, 1941, in respect of a temperature indicator (grantee: English Electric Co. Ltd.).

Any person may give notice of opposition by lodging Patents Form No. 24 at the Patent Office, 25, Southampton Buildings, W.C.2, on or before September 14.

New London Transport Station Names.—Four Underground stations were renamed on September 1. They are Mark Lane (District & Inner Circle Lines), to be Tower Hill; Enfield West (Oakwood) (Piccadilly Line), to be Oakwood; Queen's Road (Central Line), to be Queensway; Bayswater (Queen's Road) (Metropolitan Line), to be Bayswater (Queensway). On the night of August 31, billposters carried out a transformation involving not only the four stations concerned, but the entire Underground system. Seven thousand paper slips bearing the new station names were printed in thirty-one sizes, and fifty different kinds of paper slips were pasted over the glass panels of ticket-issuing machines. Small paper panels giving the alterations were placed on all Underground maps, which will bear the new names in their next reprinting. Permanent alteration of the countless enamelled-iron signs and maps will take up to six months to complete. All tickets will be reprinted with the new names, but issued only when existing stocks are exhausted. Fare boards on some bus routes are being altered to read "Queensway" and "Oakwood." The renaming of Mark Lane is a reversion, for the original station on the Inner Circle, opened in 1882, was called "Tower." Mark Lane Station, just to the west, and the extension to Mansion House were opened on October 6, 1884, and Tower closed a week later. The change to "Oakwood" was at the request of the local council. The other alterations were necessitated by the renaming of Queen's Road as Queensway.

Scottish Machine Tool Results.—A statement by the Chairman, Sir Harry Greer, circulated with the report and accounts of the Scottish Machine Tool Corporation Limited, showed that profit for the year to March 31 was £68,174 before providing for taxation, but after charging depreciation, war damage contributions, and directors' fees. The corresponding figure for the previous year was £50,896, so that net profits have increased by £17,278. The directors recommend a final dividend of 5 per cent., less income tax at 9s., making with the interim dividend already paid, 8 per cent. for the year.

Railway Views Sought on Manchester Station Plans.—It is reported that the railway companies have been invited to meet the technical officers of the Manchester and Salford Corporations and the Manchester & District Regional Planning Committee to express their views on the railway aspects of the City of Manchester Plan. It is stated that the Ministry of Transport has refused to discuss the scheme in detail until the views of the companies are known, but that at this stage it is opposed to the concentration of Victoria, Exchange, Salford, and Central Stations in the proposed Trinity Station.

Institute of Welding.—A meeting of the North London Branch of the Institute of Welding will take place on September 11, when a lecture on "The Weldability of Malleable Cast Iron" will be given by Mr. T. J. Palmer, A.M.Inst.W., in the Fyvie Hall of the Polytechnic, Regent Street, W.1, at 7.30 p.m. At a meeting on October 16, at 7.30 p.m. at the Technical College, Acton, a lecture on the "Development of the Modern Electrode" will be given by Dr. J. H. Patterson; and at a meeting on November 13, at 7.30 p.m., at the Technical College, East Ham, a lecture on "Repairing and Reclamation" will be given by Mr. F. Clark, M.B.E.

Tourist Conference Agenda.—Vexatious travel restrictions hindering the free movement of tourists form an important item on the agenda for the conference of international tourist organisations to be held in London during the first week in October. The Travel Association of Great Britain & Ireland, which is calling the conference, announces that the agenda will include the following items:—Problems arising from passports and visas, customs, immigration, and currency control; scope and standardisation of tourist statistics; students' and young peoples' exchange visits; formation of an international organisation of national tourist bodies; the exchange of tourist publicity literature between countries, and conditions governing entry of all such material. Among the countries which already have named their delegates are New Zealand, France, Belgium, Switzerland, Czechoslovakia, Denmark, Norway, Sweden, Southern Rhodesia, Malaya, Monaco, and Eire. The British Travel Association has appointed a special conference sub-committee to deal with the hospitality and entertainment of the delegates, the Chairman of which is Mr. E. W. Wimble, C.B.E.

New G.W.R. Posters.—We have received from the Great Western Railway copies of two new posters which form part of a series of eleven now being issued by all four main-line companies. "Wales" (G.W.R. and L.M.S.R.) depicts a mountainous landscape suggestive of

British and Irish Railway Stocks and Shares

Stocks	Highest 1945	Lowest 1945	Prices Sept. 3, 1946	Prices Rise/Fall
G.W.R.				
Cons. Ord.	60⅜	47½	55½	—
5% Con. Pref. ...	124½	104½	112½	— ½
5% Red. Pref. (1950)	107⅜	101½	103½	—
5% Rt. Charge ...	137½	120	127½	— 1
5% Cons. Guar. ...	135½	117	121½	— 1
4% Deb.	118	106	114½	— 1
4½% Deb.	119½	108	116½	—
4½% Deb.	124½	111½	122	—
5% Deb.	138	124	133½	—
2½% Deb	83	74½	88½	—
L.M.S.R.				
Ord.	33	23½	27	— ½
4% Pref. (1923) ...	65	50	53½	+ ½
4% Pref.	80⅜	69½	75½	+ ½
5% Red. Pref. (195[illegible])	106½	99½	102½	—
4% Guar.	106½	97	100½	—
4% Deb.	110½	102	108	+ 1
5% Red. Deb. (1952)	110½	103½	106½	—
L.N.E.R.				
5% Pref. Ord. ...	8½	5½	5⅝	+ ⅛
Def. Ord.	4½	2⅜	2¼	— ⅛
4% First Pref. ...	62½	49½	51½	+ ½
4% Second Pref. ...	33½	24½	26½	—
5% Red. Pref. (1955)	103	96	99	—
4% First Guar. ...	104½	95	98½	—
4% Second Guar. ...	97	89½	94½	+ ½
3% Deb.	91⅜	82¼	94	+ 1½
4% Deb.	109⅜	101	108	+ 1
5% Red. Deb. (1947)	103⅜	100	100	—
4½% Sinking Fund Red. Deb. ...	106⅜	103	105½	—
SOUTHERN				
Pref. Ord.	79½	63	71	+ ½
Def. Ord.	27	20⅛	20½	+ ¼
5% Pref.	124½	104	109½	— 1
5% Red. Pref. (1964)	117	107	109½	—
5% Guar. Pref. ...	135¾	117	122½	—
5% Red. Guar. Pref. (1957)	117	106½	111½	—
4% Deb.	117	104½	112	— ½
5% Deb.	137	124	131½	—
4% Red. Deb. (1962-67)	112	104½	109½	—
4% Red. Deb. (1970-80)	113½	104	109½	—
FORTH BRIDGE				
4% Deb.	106	103	106	—
4% Guar.	106	101	103	—
L.P.T.B.				
4½ "A"	125	117	125½	—
5% "A"	135	127	134½	—
3% Guar. (1967-72)	100	97½	104½	+ ½
5% "B"	125½	115	120½	—
"C"	70	58	61½	+ 1
MERSEY				
Ord.	37	31½	30	—
3% Perp. Pref. ...	72½	68¾	71½	— 1½
4% Perp. Deb. ...	104½	104	105	—
3% Perp. Deb. ...	84	78½	82½	—
IRELAND*				
BELFAST & C.D.				
Ord.	8⅛	6	7½	—
G. NORTHERN				
Ord.	34	24½	40	— 1½
Pref.	52½	42⅜	60½	— ½
Guar.	80	68	91½	+ ½
Deb.	97½	87½	105	— 1
IRISH TRANSPORT				
Common	—	—	19/0	+ 3
3% eb.	—	—	103¾	+ ⅛

* Latest available quotation

OFFICIAL NOTICES

Crown Agents for the Colonies

COLONIAL GOVERNMENT APPOINTMENTS

APPLICATIONS from qualified candidates are invited for the following post:—

ACCOUNTANT required by the Gold Coast Government Railway for one tour of 12 to 24 months with possible permanency. Salary £400, rising to £720 a year. Commencing salary according to qualifications and experience and war service. On salary of £400 a year a local allowance of £60 is payable and separation allowance for married men of between £84 and £204 a year according to number of dependants. Outfit allowance £60. Free passages and quarters. Candidates, not over 35, must have a thorough knowledge of book-keeping with practical experience in Railway Accounting work and be capable of taking full charge of any section of a Railway Accounting organisation. Apply at once by letter, stating age, whether married or single, and full particulars of qualifications and experience, to the Crown Agents for the Colonies, 4, Millbank, London S.W.1, quoting M/N/16204, on both letter and envelope.

DEMOBILISED Lt.-Col., R.E. (Transportation), seeks change of job, not necessarily engineering, with considerably increased degree of responsibility. Accustomed organising and administration; 24 years' rly. mechl. engineering and locomotive operation, plus military railway operating. A.M.I.C.E., A.M.I.Mech.E., M.I.Loco.E. Age 47, married. Overseas considered if climate, educational facilities and other conditions suitable family. Author of textbooks. Limited capital available.—Box 21, c/o *The Railway Gazette*, 33, Tothill Street, London, S.W.1.

THE Hunslet Engine Co. Ltd., Leeds, are urgently requiring the services of Senior Draughtsmen. Men with Locomotive experience preferred but not essential provided applicants can satisfy requirements. Prospects of continuous work with good working conditions and canteen facilities.—Apply, 125, Jack Lane, Leeds 10.

SECTIONED PERSPECTIVE VIEW OF LOCOMOTIVE FRONT END. A notable drawing of L.M.S.R. class "7P" 4-6-2 locomotive of the latest type. Reprinted from *The Railway Gazette*, June 15, 1945. *Price 2s. 6d. Post free 2s. 8d.*

SITUATION Wanted as Works Manager or Assistant in Railway Carriage Wagon Works, extensive knowledge of building and repairs of all types, including mass production. Age 39. At present Assistant Works Manager on British Railway abroad. Box No. 20, *The Railway Gazette*, 33, Tothill Street, Westminster, London, S.W.1.

THE RAILWAY SYSTEM OF JAMAICA. A general description of the system and its traffics, with an account of economic problems; the motive power used; and some features of operation. By H. R. Fox, B.Sc., M.Inst.C.E., General Manager, Jamaica Government Railway. Reprinted from *The Railway Gazette*, January 5 and 12, 1945. *Price 1s. Post free 1s. 2d.*

THE "PAGET" LOCOMOTIVE. Hitherto unpublished details of Sir Cecil Paget's heroic experiment. Eight single-acting cylinders with rotary valves. An application of the principles of the Willans central-valve engine to the steam locomotive. By James Clayton, M.B.E., M.I.Mech.E. Reprinted from *The Railway Gazette*, November 2, 1945. *Price 2s. Post free 2s. 3d.*

Snowdonia, and is the work of Mr. Leonard Richmond. "South Devon" (G.W.R. and S.R.), by Mr. Frank Newbould, is an effective setting against an emerald sea of the well-known red cliffs of Devon.

Naming of L.M.S.R. Locomotive "Aden."—On September 4 at Euston station, Lt.-Colonel Sir Bernard Reilly, K.C.M.G., C.I.E., O.B.E., formerly Governor of Aden and now in charge of Aden affairs at the Colonial Office, formally named "Jubilee" class locomotive No. 5633, *Aden*. Sir Robert Burrows, Chairman, L.M.S.R., presided and was supported by other L.M.S.R. officers. The locomotive is painted in the new L.M.S.R. livery: black with maroon edging and maroon and straw lining.

G.W.R. Sailing Tickets Suspended.—The issue of sailing tickets on the G.W.R. Fishguard—Waterford route will be suspended in both directions after September 30 and throughout next winter and spring of 1947, except for a period during the Christmas and New Year holidays, when they will be re-introduced. Sailing tickets for the Channel Islands *via* Weymouth will be suspended from October 7 until further notice.

Metropolitan Section, Institute of Transport.—The Council of the Institute of Transport is circularising Corporate Members in the metropolitan area to discover whether they favour the formation of a Metropolitan Section, constituted on the same lines as the existing Local Sections. Members are asked to reply in the affirmative only if they feel able to give such a Section reasonably active support. If the response is sufficient a meeting will be held to discuss the proposal.

British Aluminium Co. Ltd. Acquires Falkirk Rolling Mills.—The British Aluminium Co. Ltd. announces that the Falkirk Rolling Mills, designed and operated for the Government during the war period, have been acquired for commercial purposes. The factory was originally laid out primarily for the production of heat-treated aluminium alloys for aircraft, but is now being used for producing also sheet and coiled strip for prefabricated houses and furniture, and for many other new or re-established peacetime uses for aluminium. The plant is one of the largest and most up-to-date units in the country for producing sheet and strip rolled products in pure aluminium, and the full range of work-hardened and heat-treated alloys. Sheets will be available up to 18 ft. × 6 ft. × ½ in. thick or 50 ft. × 4 ft. × ⅛ in. thick; coils up to 6 ft. wide (4 ft. wide if heat-treated) and 1,500 lb. weight; and plates up to 30 ft. × 6 ft. and 2,000 lb. weight. The mills provide an important addition to the manufacturing capacity of the company, particularly for rolling the large sizes and heavy gauges required for very large aircraft and the heavy engineering industries.

Silentbloc Limited.—A profit of £74,882 is shown for the year to May 31, against £140,396 in 1944-45. After provision for directors' fees, depreciation, and taxes, and adding £5,379 over-provision for E.P.T. in earlier years, the net profit is £26,151, comparing with £20,468. The directors recommend a final dividend of 12½ per cent., making a total of 25 per cent., as in the previous year. The carry-forward is £17,982, against £13,487 in 1944-45.

Sale of Surplus Machine Tools.—An "on-site" sale of 300 machine tools will be opened at the K.L.G. Plug Factory, Bridgend Trading Estate, South Wales, on September 18, and will last until September 24. Any machines not disposed of during the sale will be on view at the factory from September 25 to October 1, between 10 a.m. and 4 p.m. except Saturday and Sunday, for competitive tendering. The machines will include capstan lathes, millers, grinders, drillers, and miscellaneous types.

New Portable Floodlighting Set for London Transport.—The London Passenger Transport Board recently carried out tests at Kilburn Viaduct, Metropolitan Line, of a portable floodlighting set for use by permanent-way maintenance gangs working on Underground lines at night. The set consists of a 1-kW. generator on which are mounted two telescopic masts, capable of being extended to 15 ft., each carrying a 500-watt flood lamp. The equipment measures 2 ft. 6 in. long and 20 in. wide, weighs 340 lb., and can be carried easily by four men. A small petrol engine, which consumes approximately one pint of petrol an hour, is used to drive the generator. Two sizes of generator, for 100-V. and 50-V. output, are available. After the satisfactory test at Kilburn Viaduct, a further test is to be made shortly at Ravenscourt Park. Permanent floodlighting has now been installed at Queens Park, Morden, and Aldgate Stations, where there is considerable permanent-way junction work maintained at night, and schemes are under preparation for installations at Earls Court and Baker Street.

Wagon Repairs Limited.—Sir Leslie Boyce, K.B.E., Chairman of Wagon Repairs Limited, said at the company's annual general meeting that, during the year under review, the company's output of repaired wagons was the highest recorded in their history and the financial result exceeded that of the previous year. The favourable balance was the result of the increased output and more economical working, and had not been brought about by increased prices. The outlook for the current year was favourable and, subject to supplies of essential materials being available, the company and its associated companies should have another satisfactory trading year.

Aldershot & District Traction Co. Ltd.—Mr. W. T. James, Chairman of the Aldershot & District Traction Co. Ltd., said at the annual general meeting of the company that gross revenue had declined by approximately one-eighth, whilst expenses had increased by about one-fifth on last year. Operating expenses continued to increase, and were now no less than 80 per cent. above those of pre-war. This was due largely to increases in wages and materials. Regarding nationalisation proposals, the Chairman said he sincerely hoped that the Government would recognise the efficiency of the present organisation and control of road passenger transport, and that, on reflection, it would regard the loss of this efficiency and smooth running as being too great a price to pay for the achievement of their ideological aims.

London Transport's Extended Use of Fluorescent Lighting.—London Transport announces that Piccadilly Circus station is to be equipped throughout with tubular "daylight" lighting. As recorded in our issue of October 12, 1945, the Piccadilly Line platforms at this station have been fitted experimentally with this type of lighting, and now the remainder of the station, the ticket hall, Bakerloo Line platforms, escalator shafts, lower concourses and passages are to be flooded with "daylight." Fluorescent tubular lighting will be standard for all tube stations to be newly designed and built, including those on the eastern extension of the Central Line. Tests with these lights are being carried out now at Gillingham Street bus garage, and will be made also in train inspection pits in railway depots. There are two railway coaches fitted experimentally with tubular lighting—one on the District Line and one on the Metropolitan; its extended use in Underground trains, however, has yet to be decided.

Railway Stock Market

A brighter tendency in stock markets has reflected hopes of a better turn in international affairs, although caution was indicated by absence of improvement in buying interest in most sections. Renewed strength of British Funds had a dominating influence and was attributed to the terms of the Sheffield Corporation and Nigerian Government conversion operations. Dividend announcements produced some good industrial features, and there was considerable activity in a number of recently introduced shares.

Iron and steels appeared to be less active, but recent gains in this section were fully maintained, and with the prospect of nationalisation being postponed for some while, yields in many cases are regarded as attractive in the market. Guest Keen were higher again, Ruston & Hornsby improved, and Thos. Firth & John Brown rallied further. Vulcan Foundry were 29s. 9d., Beyer Peacock 23s. 9d. and G. D. Peters 5s. shares 20s. 6d. Wolverhampton Metal 5s. shares, which were placed at 29s. 4½d., opened at 30s. 6d. and later rose in active dealings to 33s. 6d.

Market interest in railway stocks centred mainly on Argentine rails, which have continued to show sharp fluctuations on reports and further views of the Anglo-Argentine talks. After a fresh decline on reports of a deadlock, prices again declined; but there was an all-round rally when it became known that there are good prospects of early resumption of the talks on a wider basis. Central Uruguay Railway stocks participated in the upward movement on the news that the British Mission is conducting commercial talks in Uruguay.

There has been no marked expansion of business in Argentine rails, but with the great majority of holders apparently prepared to adopt a waiting attitude because of confidence that the British Mission would not agree to unjust terms for the railways, moderate buying or selling tends to have a disproportionate influence on prices.

Apart from considerations of the outcome of the talks, sentiment is also influenced to some extent by hopes of better results for the past financial year, particularly in the case of Buenos Ayres Western.

It now seems that the Argentine talks may prove to be protracted, bearing in mind the varied and complicated matters under discussion. Nevertheless, hopefulness as to the outcome persists in responsible quarters. It is becoming increasingly clear that a satisfactory solution is in the best interests of the Argentine and Great Britain in view of the benefits to be derived from paving the way for expansion of trade between the two countries.

Home rails have turned dull again, and ordinary stocks showed fractional declines now the recent small increase in buying interest has subsided. Nationalisation uncertainty continues to dominate the attitude of investors, although the large yields on the junior stocks probably more than allow for uncertainties as to the future. Moreover, it is by no means improbable that fair nationalisation compensation would justify market prices well above those now current.

Compared with a week ago, Great Western has receded from 56 to 55¾, and the 5 per cent. preference and 4 per cent. debentures at 112 and 114 respectively were both fractionally lower; the guaranteed stock remained at 122. L.M.S.R. was 27, comparing with 27¼ a week ago, but the senior preference remained at 75½ and the 1923 preference at 53½; the 4 per cent. debentures strengthened to 108. L.N.E.R. second preference held its recent improvement to 26½, as did the first preference at 51½, while the first guaranteed firmed up to 98½.

Southern deferred at 20⅜ lost a small part of its recent improvement, but the preferred ordinary at 71 was the same as a week ago; the 4 per cent. debentures remained at 112, and the 5 per cent. preference eased to 110. There was again a fair amount of interest in London Transport issues, the "A" and "B" moving slightly higher, and the "C" gained a further point at 61½. It is being generally assumed that whatever the future, the position of holders will be adequately safeguarded by the statutory dividend rights of the "C" stock.

Reflecting the upswing in Argentine rails, Buenos Ayres Great Southern rallied from 12¼ to 13½, the 5 per cent. preference at 27½ has recovered part of a further decline shown at the end of last week, as have the 4 per cent. debentures at 71. Buenos Ayres Western rallied a point to 15½ early this week and the 4 per cent. debentures were 69. Buenos Ayres & Pacific was 8 with the 1912 debentures good at 47. Central Argentine ordinary recovered to 9½ and the 4 per cent. debentures rallied 1½ at 67½.

Central Uruguay second debentures rose 2½ to 33 and the ordinary stock at 8½ was nearly a point better. Elsewhere, however, Nitrate Rails lost further ground at 75s. San Paulo ordinary was steady at 50, and United of Havana 1906 debentures remained at 16½. French railway sterling bonds were less firm.

Traffic Table and Stock Prices of Overseas and Foreign Railways

	Railways	Miles open	Week ended	Traffic for week: Total this year	Traffic for week: Inc. or dec. compared with 1944/5	No. of Week	Aggregate traffics to date: Totals 1946/7	Aggregate traffics to date: Totals 1945/6	Aggregate traffics to date: Increase or decrease	Shares of Stock	Prices: Highest 1945	Prices: Lowest 1945	Prices: September 3, 1946
				£	£		£	£	£				
South & Central America	Antofagasta	834	25.8.46	31,910	+ 3,000	34	1,089,740	1,014,960	+ 74,780	Ord. Stk.	12	8¾	10
	Arg. N.E.	753	24.8.46	ps.305,300	+ ps.1,800	B	ps.2,504,800	ps.2,438,200	+ ps.66,600	,,	10	5¾	8
	Bolivar	174	July, 1946	4,264	+ 137	31	30,100	34,402	− 4,302	6 p.c. Deb.	8½	5½	6½
	Brazil	—	—	—	—	—	—	—	—	Bonds	25	17	27
	B.A. Pacific	2,771	24.8.46	ps.2,025,000	+ ps.22,000	B	ps. 17,013,000	ps.15,864,000	+ ps.1,149,000	Ord. Stk.	7	5	8
	B.A.G.S.	5,080	24.8.46	ps.3,167,000	−ps.222,000	B	ps. 26,203,000	ps.24,466,000	+ ps.1,737,000	Ord. Stk.	13⅜	10½	13½
	B.A. Western	1,924	24.8.46	ps 1 349,000	+ ps.131,000	B	ps. 9,411,000	ps.8,745,000	+ ps.666,000	,,	12¼	9½	15½
	Cent. Argentine	3,700	24.8.46	ps.3,138,170	−ps. 67,830	B	ps. 24,687,055	ps.24,102,250	+ ps. 584,805	,,	9¾	7	9½
	Do.	—	—	—	—	—	—	—	—	Dfd.	5	2⅞	4½
	Cent. Uruguay	970	24.8.46	32,407	− 324	7	277,833	275,784	+ 2,049	Ord. Stk.	7½	4	8½
	Costa Rica	262	May, 1946	32,411	+ 5,206	49	319,231	259,151	+ 60,080	Stk.	16½	13	12
	Dorada	70	June, 1946	35,600	+ 1,820	27	186,275	182,375	+ 3,900	1 Mt. Deb.	103	102	102½
	Entre Rios	808	24.8.46	ps.441,200	+ ps.10,600	8	ps.3,386,700	ps. 3,415,300	− ps. 28,600	Ord. Stk.	7½	4½	6½
	G.W. of Brazil	1,030	24.8.46	25,200	+ 2,200	34	928,700	832,200	+ 96,500	Ord. Stk.	30/-	23/6	22/6
	Inter. Ctl. Amer.	794	June, 1946	$814,722	+ $12,606	26	$6,472,238	$5,532,507	+ $939,731	—	—	—	—
	La Guaira	22¾	July, 1946	6,659	+ 298	30	39,698	43,290	− 3,592	5 p.c. Deb.	78	70	58xd
	Leopoldina	1,918	24.8.46	71,113	+ 10,478	34	1,950,469	1,699,980	+ 250,489	Ord. Stk.	4¼	3½	3¾
	Mexican	483	31.5.46	ps.1,464,000	+ ps.459,100	22	ps.18,661,800	ps.13,441,600	+ ps.5,220,200	Ord. Stk.	¼	¼	¼
	Midland Uruguay	319	July, 1946	18,824	− 906	5	18,824	19,730	− 906	—	—	—	—
	Nitrate	382	15.8.46	7,331	− 488	33	135,362	111,795	+ 23,567	Ord. Sh.	75/6	67/6	73/9
	N.W. of Uruguay	113	July, 1946	4,575	− 1,517	2	—	—	—	—	—	—	—
	Paraguay Cent.	274	23.8.46	G68,595	− G5,853	8	G489,385	G515,778	− G26,393	Pr.Li.Stk.	79⅞	77	73½
	Peru Corp.	1,059	July, 1946	150,902	+ 16,152	5	150,902	134,750	+ 16,152	Pref.	10⅜	7⅜	11½
	Salvador	100	May, 1946	£ 123,750	+ £ 11,750	45	c1,517,450	c 1,420,000	+ £ 97,450	—	—	—	—
	San Paulo	153½	—	—	—	—	—	—	—	Ord. Stk.	60¾	50½	51
	Taltal	156	July, 1946	3,795	+ 2,010	5	3,795	1,785	+ 2,010	Ord. Sh.	17/-	10/6	18/9
	United of Havana	1,301	24.8.46	55,466	+ 9,248	B	437,647	372,005	+ 65,642	Ord. Stk.	3	1	1¼
	Uruguay Northern	73	July, 1946	1,098	− 834	5*	1,098	1,932	− 834	—	—	—	—
Canada	Canadian National	23,535	July, 1946	8,611,250	−1,350,000	27	55,150,500	63,428,500	− 8,278,000	—	—	—	—
	Canadian Pacific	17,037	21.8.46	1,399,500	− 16,500	34	45,095,250	50,512,000	− 5,416,750	Ord. Stk.	24	14⅜	21½
Various	Barsi Light†	202	June, 1946	1,893	− 140	14	73,395	66,652	+ 6,743	Ord. Stk.	131	123	114
	Beira	204	June, 1946	78,908	+ 1,361	34	676,166	693,407	− 17,241	—	—	—	—
	Egyptian Delta	607	31.7.46	19,446	+ 1,759	16	201,088	196,080	+ 5,008	Prf. Sh.	10	8⅛	5
	Manila	—	—	—	—	—	—	—	—	B. Deb.	71	55½	67
	Mid. of W. Australia	277	June, 1946	16,780	+ 4,914	1	208,969	219,103	− 10,134	Inc. Deb.	97¼	85	75
	Nigeria	1,900	June, 1946	441,797	+ 167,749	14	1,120,904	837,609	+ 283,295	—	—	—	—
	Rhodesia	2,445	June, 1946	533,593	+ 10,968	34	4,600,381	4,510,817	+ 89,564	—	—	—	—
	South African	13,323	27.7.46	1,089,864	+ 74,497	15	18,456,750	16,670,890	+ 1,785,860	—	—	—	—
	Victoria	4,774	May, 1946	1,351,280	+ 4,246	—	—	—	—	—	—	—	—

† Receipts are calculated @ 1s. 6d. to the rupee.